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FEDERAL REGULATION OF AUTOMATIC
DATA PROCESSING AND ITS EFFECTS
ON THE DEPARTMENT OF THE NAVY
by
LT Joe Leo Shaw, USN

Thesis
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FEDERAL REGULATION OF AUTOMATIC DATA PROCESSING
AND ITS EFFECTS ON THE DEPARTMENT OF THE NAVY

By

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Bachelor of Science

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Theory
~~SECRET~~

CONCLUSION

Electronics have dramatically increased in position of importance, especially since the early 1960s, and the same is true of the military use of the same. This is particularly true of the use of electronics in the military environment. The United States Department of Defense has recognized the importance of electronics in the military environment, and has taken steps to ensure that the military is prepared to meet the challenges of the future. This report is a study of the military use of electronics, and is intended to provide a basis for the development of a strategy for the future.

The use of electronics in the military environment is a complex issue, and one that has received little attention in the past. This report is a study of the military use of electronics, and is intended to provide a basis for the development of a strategy for the future. The report is divided into three parts: a description of the current state of the art, a description of the challenges that the military faces, and a description of the strategies that the military should adopt. The first part of the report describes the current state of the art, and the second part describes the challenges that the military faces. The third part of the report describes the strategies that the military should adopt. The report is intended to provide a basis for the development of a strategy for the future, and is intended to be a guide for the military in the development of its strategy.

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PREFACE

Electronic data processing equipment is playing an increasingly important role in the daily lives of every man and woman. This is particularly true of the men and women who serve in the Federal Government. The volume and complexity of the information processed by the Federal Government computers stagger the imagination. It would be physically impossible to carry out many Federal programs without electronic data processing equipment.

The use of electronic data processing equipment in the Federal Government has produced many management problems. These problems have become increasingly clear to both the Executive and Legislative Branches during the past eight years. Two events in 1965 serve to highlight this concern. In March, President Johnson forwarded The Report to the President on the Management of Automatic Data Processing in the Federal Government to the Congress. The report and its recommendations were based on an intensive year-long study by the Bureau of the Budget. In October, the President approved Public Law 89-306 which is the first and only Public Law directed specifically toward the management of automatic data processing equipment. This paper investigates the impact that this Legislation and Report will have on the management of automatic data processing in the Department of the Navy.

The research leading to this paper consisted of an examination of the Federal Government documents dealing with the management of automatic data processing and personal interviews with members of the Government automatic data processing staffs. I have attempted to determine how well the Department of the Navy conforms to present automatic data processing management policy; how this policy is likely to be modified by the Report and the Legislation; and how this will effect the Department of the Navy.

Chapter I reviews the development and growth of data processing, the associated management problems and the attempts to resolve these problems.

Chapter II is an analysis of the present Government-wide automatic data processing management policies and how these policies might be modified.

Chapter III is an analysis of the present Department of the Navy automatic data processing program.

Chapter IV presents a brief summary of the report and the conclusions drawn.

I wish to express my sincere gratitude to the staff members who generously took time from their busy schedules for my interviews.

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CHAPTER I

MANAGEMENT PROBLEMS AND MANAGEMENT'S RESPONSE

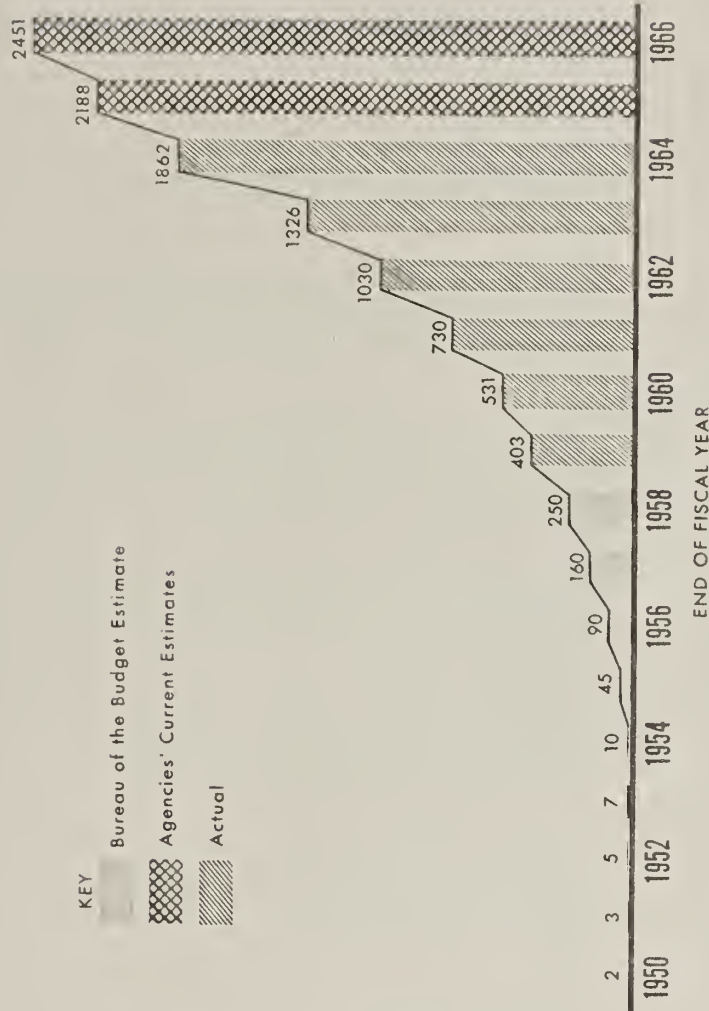
Rapid Growth and the Associated Problems

The growth of automatic data processing.--The Federal Government was a pioneer in the development and use of automatic data processing. Faced with the problem of collecting, processing and summarizing huge quantities of information, the Bureau of the Census and the Department of Health were using mechanical data processing equipment prior to 1900. It was only after the vast research efforts of World War II had produced the first electronic digital computer, that the growth of automatic data processing became explosive. The Army Ordnance Corps installed the first Government electronic computer in 1945. There were ten Government computer installations in 1954; today there are more than two thousand.¹ Exhibit 1 summarizes the growth in the number of computers installed. Exhibit 2 summarizes the number of man-years applied to automatic data processing. Exhibit 3 summarizes the total costs incurred.

These figures do not include the estimated 2000 specialized computers used by the Department of Defense nor the estimated 1800 computers used by Government Contractors. Thus,

¹U. S., Congress, House, Committee on Government Operations, Automatic Data Processing Equipment, 89th Cong., 1st Sess., 1965, H. Report 802 to accompany H. R. 4845, p. 6.

Growth in Number of Computers in the Federal Government



The sustained growth in the number of computers reflects the extension of computer use into virtually every major field of Government activity. Computers are now being used, for example, to administer veterans' benefits and social security benefits,

control air traffic, forecast weather, process income tax returns, track missiles, control inventories, compile census data, conduct complex scientific analyses, and perform various administrative functions. A detailed listing of computer uses appears in Table 5.

Source: Inventory of Automatic Data Processing Equipment in the Federal Government, Bureau of the Budget, June, 1965.

Man-Years Utilized in ADP Operations



The number of man-years applied to the management and operation of ADP units continues to increase because of the sustained growth in the number of computer units. Employment in computer units increased from 58,900 in fiscal year 1964 to 63,000 in fiscal year 1965, while employment in punched-card units remained constant.

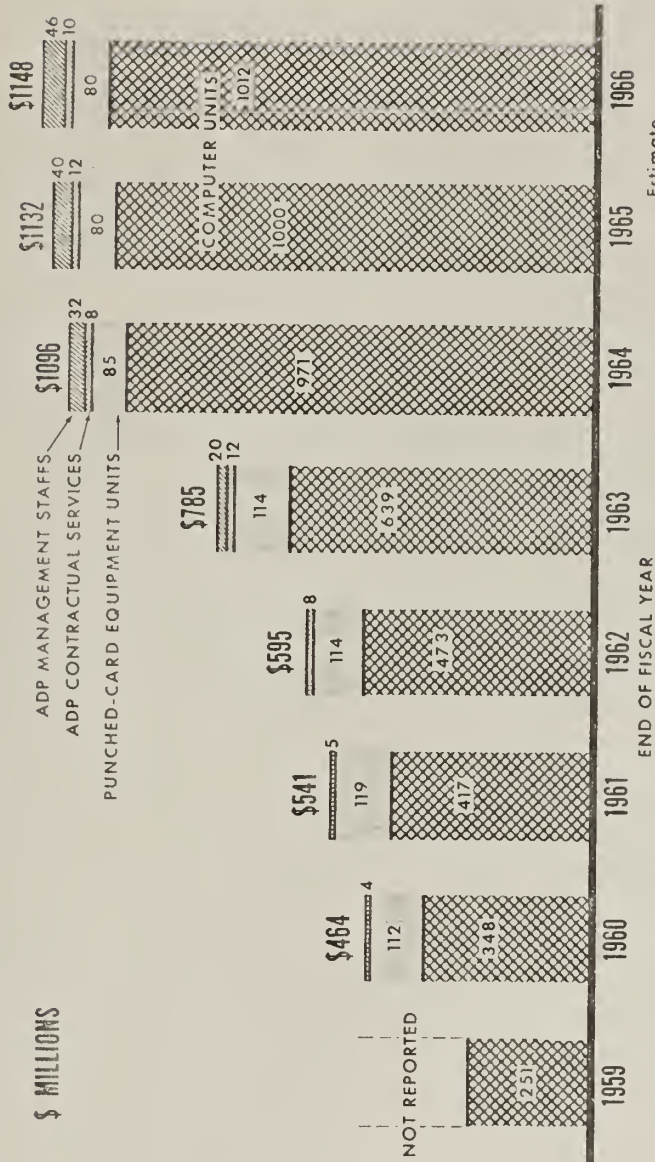
Note that the increase in the man-years applied to computer units between 1959 and 1965 totals 38,600 or 158 percent, while the number of computer units (shown on Chart 2) increased from

271 to 833, or 207 percent. This percentage difference is attributed to more effective utilization of personnel and the use of smaller computer units.

Personnel reported for ADP units include (a) supervisors, (b) systems analysts and programmers, (c) equipment operators, and (d) supporting clerical personnel. In addition, ADP management staff personnel who are not directly associated with any specific ADP unit are shown as a separate category.

Source: Inventory of Automatic Data Processing Equipment in the Federal Government, Bureau of the Budget, June, 1967.

Total Costs-All ADP Units Excluding Military Operational and Classified Uses



ADP costs will total an estimated \$1,132 million in fiscal year 1965, an increase of \$36 million over the previous year. Costs for fiscal year 1966 are estimated at \$1,148 million. The cost increases result primarily from the continued growth in the number of computers as shown in Chart 6, but are not in direct proportion to this growth because the large one-time costs incurred each year since 1964 for computer purchases have a leveling-off effect by eliminating annually-recurring rental costs. The composition and trends of the costs for computer units are shown in Chart 7.

The costs of ADP units include the salaries of personnel, equipment rentals, supplies, contractual services, equipment purchase and maintenance, and site preparation. Added to these costs are the cost of ADP contractual services procured either from Government or commercial sources by organizations not having ADP units of their own, and the salary costs of ADP management staffs that are not directly associated with a specific ADP unit.

Source: Inventory of Automatic Data Processing Equipment in the Federal Government, Bureau of the Budget, June, 1965.

the total number of computers funded by the Federal Government is about 6000 and the fiscal year 1964 expenditures approached \$3 billions or about 3 per cent of the total Federal Budget.¹

The resources applied to automatic data processing are only a partial, and perhaps an insignificant measure of its real impact. The uses or applications of these resources must also be considered. These applications can be classified in many ways, but I think four basic distinctions are sufficient to indicate the real impact of automatic data processing on Federal Government Operations.

First, there are those applications that contribute directly to the mission or purpose of the using organization. These applications can be further divided into: (1) those that would be technologically impossible without automatic data processing; and (2) those which can be better performed, in terms of time, accuracy, cost or overall efficiency, by automatic data processing. The use of automatic data processing to track and control space vehicles is an example of the former; the processing of records and payment checks by the Social Security Administration is an example of the latter.

Those applications that support the primary mission of an organization comprise the second general classification. These are often called "housekeeping applications." Some examples of these are military and civilian pay and personnel

¹Carl W. Clewlow, "Management of Automatic Data Processing in Government," The Armed Forces Comptroller, X (March, 1965), p. 19.

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systems in the Department of Defense, and the financial management reports system in the National Aeronautics and Space Administration. Appendix A lists the general applications in use in the Federal Government as identified by the Bureau of the Budget. The Inventory of Automatic Data Processing Equipment in the Federal Government¹ provides a comprehensive listing of applications for each of the Federal Agencies that uses one or more computers. Indeed, automatic data processing encompasses nearly every aspect of Government operations.

Management problems aggravated by rapid growth.---The rapid growth of automatic data processing in the Federal Government has magnified the management problem but has not created all the problems, per se. These same problems could exist in a smaller setting, but the costs to the Federal Government would not be so significant. The present Federal Government automatic data processing resources are the result of the spontaneous growth of numerous independent systems in many departments and agencies. The computer introduced a new discipline to data processing and its implications, in terms of potential uses, costs, personnel requirements, and management coordination, were grossly underestimated by the responsible line managers. Underestimation of the computer was not confined to the Government. Dr. Louis T. Rader, head of the General Electric Corporation's Information Systems Division stated

¹U. S. Bureau of the Budget, June, 1965, pp. 210-356.

that, "Of all the inventions of man, none has been so underestimated as the computer."¹ It was initially thought that only a few of the very largest corporations would use electronic digital computers. Today, there are an estimated 27000 computers, valued at seven and a half billion dollars, in the United States alone.²

Problem identification.--Numerous automatic data processing problems have been identified by the various investigating staffs. They cover the entire spectrum from duplicate and inadequate systems analysis and design to inadequate methods for screening and providing for the re-use of hardware components, no longer required by their original users. The following list, while not exhaustive includes, what I believe, to be the more important.

1. The present automatic data processing information system does not provide the current, comprehensive and accurate information required for sound Government-wide management decisions.

2. The procedures for the exchange of data processing information, both within and between, the various departments and agencies are inadequate. This results in a serious duplication of effort and further strains the already scarce design and programming resources.

¹"The \$5 billion World Market for Computers," Business Week, February 19, 1966, p. 113.

²Ibid.

3. The acquisition procedures for hardware and software are inefficient.

4. There is unnecessary incompatibility in both hardware and software, making exchange of information between systems excessively expensive.

5. There are no accepted criteria with which to appraise the effectiveness of the various systems and installations.

6. Poor utilization of Government owned, and particularly Government owned contractor operated, automatic data processing equipment installations has resulted in excessive costs to the Federal Government.

A major issue, encompassing all of these management problems, is the degree of centralized control required to manage most effectively the Government automatic data processing program. The 1965 Report to the President on the Management of Automatic Data Processing in the Federal Government highlights this issue by stating:

The assignment of appropriate roles to the different echelons of management in the Federal Government is of great importance. Some computer applications, particularly those involved in administrative functions, have a great deal in common and conceivably could be subject to greater centralization. On the other hand, the more significant computer applications are integral parts of agency programs, accordingly, each is a unique application and its management is a responsibility of those officials charged with mission accomplishment. The problem then becomes one of improving the effectiveness and the economy of computer utilization, both within an executive agency and in Government as a whole,

without derogating the proper authorities and responsibilities of managers in the line.¹

The General Accounting Office and the Bureau of the Budget agree that greater management resources must be applied to automatic data processing but they disagree on the organizational pattern to be followed.

The General Accounting Office proposes to co-ordinate Federal Government automatic data processing activity ". . . through the establishment of a small, highly placed central management office in the executive branch of the Government."² This office would be the Government's automatic data processing "czar" and would have the power to enforce policies that would, in the General Accounting Office's view, provide the greatest advantage to the Government as a whole rather than the greatest advantage to the agencies, individually. The Bureau of the Budget does not believe that this degree of centralization is necessary. Its 1965 Report to the President states:

In summary, we have concluded that the establishment of a separate office empowered with authority and responsibility to make decisions on the procurement and utilization of ADP equipment would dilute the responsibilities of agency heads for the management of their organization, that it would serve to divorce ADP management from the established arrangements for Presidential surveillance over the overall management of the

¹U. S., Congress, Senate, Committee on Government Operations, Report to the President on the Management of Automatic Data Processing in the Federal Government, 89th Cong., 1st Sess., 1965, Document No. 15, p. 4.

²U. S. Comptroller General, Review of Problems Relating to Management and Administration of Electronic Data Processing Systems in the Federal Government, April, 1964, p. 10.

executive branch, and that it would interfere with direct Government agency-contractor relationships unnecessarily. . . .To carry out the recommendations made in this report no significant changes would be required in existing organizational arrangements or in the assignments of responsibility to the Bureau of the Budget, U. S. Civil Service Commission, General Services Administration, the Bureau of Standards, or the departments and agencies. We believe that the existing organizational arrangements are basically sound.¹

Attempts to Formulate Effective Automatic Data Processing Management Policies

The participants.---There have been numerous attempts to develop an effective government-wide body of automatic data processing policies during the past eight years. The principle participants have been: The Congress, The Bureau of the Budget, The General Accounting Office, The General Services Administration, The U. S. Civil Service Commission, and the National Bureau of Standards.

The Bureau of the Budget.---The Bureau of the Budget has assumed the leading role in the areas of researching the management problems and developing broad guidelines for the various departments and agencies. The Bureau of the Budget has conducted two very intensive staff studies; the first in 1958-1959 and the latter in 1964-1965. The reports resulting from these studies were extremely valuable in pointing out deficiencies and recommending positive actions to correct them. A comparison of the two reports, however, suggests that little progress was made in the six years between the two studies, particularly in

¹Senate Committee on Government Operations, Report to the President. . . , p. 68.

the areas of compatibility, information, and evaluation criteria.

The 1959 Bureau of the Budget Responsibility Study recommended that the Bureau of the Budget be responsible for:

- 1) Using established lines of communication, existing organizational relationships and its membership on the Policy Committee for the Joint Accounting Improvement Program and other such groups to insure effective internal and Government-wide coordination of the ADP program with related programs and activities.
- 2) Formulating and promulgating policy, criteria, and planning guidance for the ADP program of the Government.
- 3) Planning and coordinating the implementation of government-wide ADP orientation and training.
- 4) Establishing government-wide formulas for costing ADP applications and reviewing and analyzing summary cost data in terms of dollars and manpower utilization.
- 5) Fostering, promoting, and coordinating the interagency sharing of ADP equipment.
- 6) Developing specific plans for an experimental computer service center and, if deemed feasible, taking action to assure the creation and operation of same.
- 7) Coordinating ADP research and development programs of the government.
- 8) Providing leadership in a government-wide effort to alleviate the problems of incompatibility of ADP equipment.
- 9) Fostering and promoting studies which will lead to minimizing the vulnerability of ADP equipment to sabotage enemy attack or natural disaster.
- 10) Operating a government-wide ADP information exchange.

11) Sponsoring the continuation of the Inter-agency Committee on ADP and assuring its effective utilization.

12) Reviewing and assessing progress of ADP programs in selected agencies and for the government as a whole.

13) Fostering and promoting desirable standardization in ADP systems which are common to all agencies.

14) Using existing information sources and obtaining such additional summary information as may be essential to the effective performance of the responsibilities assigned.¹

The 1965 Bureau of the Budget report repeats most of the above recommendations and, in addition, calls for specific action in the areas of equipment acquisition and government contractor automatic data processing operations. The report suggests that the following actions be undertaken:

1. Modify existing Government-wide policies so that their precise application in different kinds of operating situations is more closely defined.

2. Develop and furnish criteria to assist agencies in evaluating whether computers are being used effectively.

3. Develop and furnish cost principles to be applied uniformly by agencies when computers and related services are shared with others on a reimbursable basis.

4. Expand existing policies for the selection of equipment to provide additional guidelines on (a) the preparation of systems specifications which are transmitted to suppliers when inviting proposals to furnish equipment, and (b) methods for evaluating suppliers' proposals.

¹House Committee on Government Operations, Automatic Data Processing Equipment, p. 14.

5. Continue present policies governing the purchase or rental of computers, except (a) to include the cost of money as a factor in comparing alternative costs, and (b) provide for a general suspension of purchase activity if a review of computer technology indicates that superior equipment will soon be available, or if prospective excesses of Government-owned equipment indicate that additional purchases should not be made. As a consequence of increased purchasing in recent years, policies governing the replacement of equipment to avoid unwarranted long-term use, and the use of alternative ways for maintaining owned equipment will be formulated.

6. Establish a firm time schedule for the negotiation of annual contracts with equipment suppliers, and seek improved contract terms.

7. Strengthen Government support of programs initiated by the American Standards Association to achieve needed compatibility among automatic data processing equipment and systems.

8. Give increased attention to the coordination and evaluation of research and development programs in the field of computer sciences. Expand the resources of the National Bureau of Standards to advance the development of computer technology and systems oriented primarily toward Government needs.

9. Extend Government policies on the purchase or rental of equipment and on the use of excess equipment to contractors who perform work for the Government (primarily Defense, Atomic Energy Commission, and the National Aeronautics and Space Administration) on a cost-reimbursement basis. Include contractor-operated equipment in intra-agency sharing arrangements.

10. Develop and prescribe a Government-wide information system to provide selected managerial levels with information needed to manage computer resources more effectively.

11. Continue present organizational arrangements and general assignments of responsibility among central and line agencies, but strengthen and augment the resources devoted to the management of automatic data processing activities.

12. Propose the enactment of legislation by the Congress which would (a) constitute an expression of congressional policy and interest with respect to effective and economical use of automatic data processing equipment, and (b) strengthen the authorities for the development, testing, and implementation of standards: the performance of research in computer sciences and the provision of advisory services by the National Bureau of Standards; and the establishment of a revolving fund to finance arrangements for the joint utilization of computer facilities.¹

In addition to these two studies, the Bureau of the Budget issued six Government-wide ADP policy documents. In 1960 Bulletin 60-6, Studies Preceding the Acquisition of Automatic Data Processing Equipment was promulgated to guide the agencies in their feasibility studies. In 1961 Circular A-54, Policies on Selection and Acquisition of Automatic Data Processing Equipment in the Executive Branch discussed the systems study, equipment selection criteria and the buy vs. lease decision. In 1963 Circular A-55, Annual Reports on the Utilization of Automatic Data Processing Equipment in the Executive Branch prescribed the formats of the reports which are the basis for the Bureau of the Budgets annual Inventory of Automatic Data Processing Equipment in the Federal Government. Also in 1963, Circular A-61, Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing Equipment in Federal Agencies was published. This provided the top level managers in the various agencies with a broad set of principles to guide them in organizing and evaluating the performance of

¹Senate Committee on Government Operations, Report to the President. . . , p. 7.

their automatic data processing resources. In 1964 Circular A-27, Policies and Responsibilities on the Sharing of Electronic Computer Time and Services in the Executive Branch encouraged maximum use of the General Services Administration's Computer Sharing exchanges and the National Bureau of Standard's Computer Service Center. In 1965, Circular A-71, Responsibilities for the Administration and Management of Automatic Data Processing Activities assigned specific automatic data processing management responsibilities to the Bureau of the Budget, The General Services Administration, The National Bureau of Standards, The Civil Service Commission and the heads of the Executive agencies.

The General Services Administration.--The General Services Administration has been primarily concerned with automatic data processing equipment acquisition. GSA has negotiated Government-wide Federal supply schedules with the manufacturers since 1955. Negotiations covering basic rental periods and optional use periods have resulted in terms more favorable to the Government. Standards of performance have been spelled out and provision for damage claims have been established. The General Services Administration Personal Property Management Regulation No. 36, Utilization of Screening of Government-Owned and Leased Electronic Data Processing Equipment requires the agencies to report excess equipment available and to consider such equipment before purchasing or renting additional equipment. In addition, the General Services

Administration has established regional sharing exchanges to promote more effective utilization of Government automatic data processing resources as outlined in the Bureau of the Budget Circular No. A-27.

The Civil Service Commission.--The Civil Service Commission has been quite active in solving the automatic data processing personnel problems on two fronts. First, the Commission has established classifications and qualifications for the skills required in the Government's automatic data processing program. It has conducted a comprehensive training program in an attempt to provide sufficient computer trained personnel. Second, the Commission has conducted an ambitious program to retrain and relocate personnel displaced by automatic data processing systems.

The National Bureau of Standards.--The National Bureau of Standards has been active in providing assistance to Government Agencies, particularly the smaller ones, with system design, programming, and equipment selection. The Bureau operates the experimental Computer Service Center in the Washington area which most often provides a complete automatic data processing package, including system design, programming, and equipment time to their customers.¹ In addition, the Bureau conducts experimental work in computer design and operation.

The Congress.--The automatic data processing management

¹Interview with Samuel N. Alexander, Technical Director, Center for Computer Sciences and Technology, National Bureau of Standards, March, 1966.

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¹Interviews with
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activities of the Congress have been centered in the Committees on Post Office and Civil Service and Government Operations in the House of Representatives. Two bills were introduced in 1963. Congressman Jack Brooks introduced H. R. 5171 which authorized the General Services Administration ". . .to coordinate and otherwise provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies." Senator Paul Douglas introduced a similar measure, S. 1577, in July 1963. H. R. 5171 was approved by the House of Representatives in July 1963 but neither bill was approved by the Senate. H. R. 4845, A Bill to Amend Title I of the Federal Property and Administrative Services Act of 1949 to Provide for the Economic and Efficient Purchase, Lease, Maintenance, Operation, and Utilization of Automatic Data Processing Equipment by Federal Departments and Agencies, was introduced in 1965 and was approved as Public Law 89-306 on October 30, 1965. This was the first, and only Public Law dealing with the management of automatic data processing.¹

The House Committee on Post Office and Civil Service conducted hearings on "Office Automation and Employee Job Security" and published a report containing twenty one recommendations in 1960. Extensive public hearings were held in 1962 and 1963 and House Report No. 350, Use of Electronic Data Processing Equipment in the Federal Government was published

¹Public Law 89-306 is reproduced in Appendix B.

in August, 1963. This Report concluded that:

Federal department and agency organizational arrangements for EDP systems are not universally adequate or suitable to the tasks to be performed and the problems to be solved. Selected aspects of management and the associated functions of control, coordination, and emergency planning also are in need of improvement.

Machine technology has progressed beyond the ability of people to use it. The technological gap should be closed by giving increased recognition to the people in the EDP system, by increased attention of top management to EDP matters, and by acceleration of automatic programming development.

The principal problem of staffing EDP systems is in the area of programmers. There is lack of communication as to the seriousness of this problem. The sources of supply are insufficient to the needs, and new and improved sources should be developed.

Problems may become aggravated in the area of recruiting engineering maintenance personnel, and action should be taken to anticipate them. There is a need also to improve the working conditions of employees on extra-hour shifts.

While Federal Government agencies have demonstrated considerable ability to control adverse effects on EDP automation on employees, the future is not assured. Therefore, there should be no letdown in existing efforts to reduce EDP's impact on Government employees, and additional constructive action should be taken.

A comprehensive statistical reporting system covering electronic data processing systems activities of the Federal Government does not exist and should be established. The system should include a means of evaluating EDP systems accomplishments for individual departments and agencies and for the Government as a whole.

There are widespread differences of opinion as to whether it is advantageous to purchase or to lease EDP systems, and the causes of the dilemma should be determined. Meanwhile, complete objectivity should be practiced and the best of

judgment exercised in making evaluations and in arriving at EDP purchase versus lease decisions. The interests of the Federal Government as a whole should be considered.

EDP systems by custom are procured via negotiated contracts and a limited number of plans. A more competitive system and new plans of procurement should be explored.

Standardization of electronic data processing systems is vital to the efficient and expeditious use of the systems by the Federal Government, and a serious need exists for a dynamic standardization program.¹

The Congress was finding many of the same problems in 1963 that the Bureau of the Budget's 1959 study had found. These same problems were to be found again in the Bureau of the Budget's 1965 study.

The General Accounting Office.---The General Accounting Office has been extremely active in the automatic data processing management field, particularly with regard to the acquisition and utilization of equipment. Comprehensive Government wide reports were issued in 1958, 1960, 1963, 1964 and 1965. The 1958 report, Survey of Progress and Trend of Development and use of Automatic Data Processing in Business and Management Control Systems of the Federal Government as of December 1957 contained the first Government-wide automatic data processing resource inventory. The 1963 report, Study of Financial Advantages of purchasing Over Leasing of Electronic Data Processing Equipment in the Federal Government, presents a strong case for increased Federal Government purchases of equipment. The

¹U. S., Congress, House, Committee on Post Office and Civil Service, Use of Electronic Data Processing Equipment in the Federal Government, 88th Cong. 1st Sess., 1963, H. Report 858, pp. 4-9.

1965 report, Management of Automatic Data Processing Facilities in the Federal Government is a critical analysis of the 1965 Bureau of the Budget Report to the President. As was indicated above, the General Accounting Office recommends a more centralized organization to coordinate and control automatic data processing than does the Report to the President.

In addition to these Government-wide studies and reports the General Accounting Office has studied particular problems in depth. A report of the House Committee on Government Operations states that, "Since 1959, the General Accounting Office (GAO) has issued about 100 audit reports revealing serious shortcomings in the acquisition and use of ADP in various departments and agencies as well as ADP acquired under cost reimbursable contracts at the expense of the Government."¹

Some reasons for optimism.---The automatic data processing management problems have continued to grow in spite of the efforts of many Government activities. In 1965, however, these efforts provided two extremely important tools with which to move ahead: a statement of congressional intent in Public Law 89-306 and basic guidelines in the Report to the President on the Management of Automatic Data Processing in the Federal Government. As Mr. Robert K. Brennan stated, "We have been plowing the same ground for a number of years. This time I

¹House Committee on Government Operations, Automatic Data Processing Equipment, p. 3.

think we will make some real progress."¹

¹Interview with Robert K. Brennan, Data Processing Systems coordinator, Data Processing Coordinating Staff, General Services Administration, February, 1966.

CHAPTER II

EMERGING MANAGEMENT PRINCIPLES

The Assignment of Authority and Responsibility

The events of 1965.--The year 1965 marked the beginning of a new era in Government automatic data processing management. Specific areas of responsibility were assigned to the Bureau of the Budget, the General Services Administration, the National Bureau of Standards, and the Civil Service Commission. The basic guidelines for these assignments are contained in two documents: Bureau of the Budget Circular No. A-71, Responsibilities for the Administration and Management of Automatic Data Processing, and Public Law 89-306.

The Bureau of the Budget.--The Bureau of the Budget, as the principal staff office to the President on matters of Government organization and management, has overall responsibility for fiscal and policy direction and control. The Bureau of the Budget, in carrying out its traditional responsibility "to conduct research in the development of improved plans of administrative management, and to advise the executive departments and agencies of the Government with respect to improved administrative organization and practice"¹ will provide centralized management coordination. An Automatic Data Processing

¹U. S. Bureau of the Budget, The Bureau of the Budget--What it is--What it does, June, 1965, p. 5.

THE EVOLUTION OF THE POLICE

The Evolution of the Police and the Department

The Year of 1905.—The year 1905 was the turning

of a new era in the history of the police. It was the year of the

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Management Branch has been established in the Office of Management and Organization to perform this function.

The General Services Administration.--The General Services Administration is responsible for the efficient acquisition, maintenance, utilization and inventory of Government automatic data processing equipment. Circular A-71 directs the General Services Administration to carry out these responsibilities by: (1) negotiating timely and more favorable Federal schedules of supply, (2) promulgating standard purchase specifications, (3) developing replacement standards and re-utilization screening procedures, (4) providing leadership in time sharing and joint utilization projects, (5) preparing Government-wide inventory and utilization reports, and (6) establishing maintenance criteria and negotiating maintenance contracts. Public Law 89-306 sets up a revolving fund, available to the General Services Administration: ". . .for expenses, including personal services, other costs, and the procurement by lease, purchase, transfer, or otherwise of equipment, maintenance, and repair of such equipment by contract or otherwise, necessary for the efficient coordination, operation, utilization of such equipment by and for Federal agencies."¹

The General Services Administration expanded its Data Processing Coordination Staff from 12 in fiscal 65 to 34 in

¹U. S. Congress, A Bill to Ammend Title I of the Federal Property and Administrative Services Act of 1949 to Provide for the Economic and Efficient Purchase, Lease, Maintenance, Operation, and Utilization of Automatic Data Processing Equipment by Federal Departments and Agencies, Public Law 89-306, 89th Cong., 1st Sess., 1965, p. 2.

fiscal 66.¹ During 1965, the staff developed the following projects (not to be construed a policies or intentions) as areas of fruitful study in carrying out its responsibilities:

TECHNICAL ASSISTANCE

Survey existing information sources and facilities relating to equipment and software capabilities and characteristics and the performance of suppliers and consultants.

Determine additional requirements necessary to assist agencies by providing comparative information on the characteristics and performance of equipment and software. (Include prototype determinations.)

Plan location, layout, and operating method for the advisory service.

Establish and operate a Data Communications Advisory Service.

Review and examine effectiveness of any performance standards for hardware and software suppliers that may be used by agencies or included in Federal Supply Schedules.

Develop and maintain necessary performance standards for hardware and software suppliers of ADPE and DCE. Consider standards for delivery schedule adherence, program support, maintenance performance, accuracy of proposals, product reliability, etc.

Determine appropriate vehicle(s) for, and disseminate performance standards to agencies, suppliers, and consultants.

Provide advice and assistance to agencies in the application, use, and monitoring of performance standards.

Expand technical assistance to agencies and improve the development and application of SDA equipment and techniques.

¹U. S., The Budget of the United States Government for the Fiscal Year Ending June 30, 1967, Appendix, P. 861.

CONTRACTING AND PROCUREMENT

Examine the relative merits of competition bidding vs. negotiated ADP contracts and recommend the most appropriate method.

Review and determine the application and impact of general Government contracting policies on the ADP program. Policies reviewed will include those relating to small business, depressed areas, and monopoly questions.

Examine manufacturers' pricing policies to determine basic economic or administrative situations which have a direct bearing on leasing and purchasing price structures.

Examine manufacturers' pricing structures and determine if and how training, programming aids, and maintenance cost factors can be stated separately from rentals and purchase prices. Examine pricing structure to determine that hardware and software for communication interface is priced separately.

Examine the application of copyright laws and regulations to computer programs and the attendant rights and responsibilities of the Government.

Ascertain the extent to which "quantity discounts" on ADPE are available and determine if and how they may be used on a broader scale.

Examine the concept of the Government as one customer for rental payments.

Examine the feasibility, legality, and practicality of applying sanction against non-cooperating manufacturers. Example: If a manufacturer did not cooperate in negotiating schedules, could the Government prohibit, or limit, consideration of his equipment until reasonable cooperation was forthcoming?

Examine the economic aspects, from the standpoint of Government and industry, of an ADP procurement effort that seeks uniform terms and conditions for hardware, software, and services.

Develop a handbook or pamphlet providing informational and instructional material on the concept, purpose, and content of Federal Supply Schedules for ADPE and how to apply, interpret, and recommend changes to their provisions.

Develop a method of providing comparative information on terms, conditions, and prices in Federal Supply Schedules for all manufacturers that can be readily used by agencies in the equipment selection procedure.

Examine the necessity for annual negotiations of Federal Supply Schedules. Recommend alternative methods of procurement.

Identify agencies that do not use Federal Supply Schedules for computer procurement and establish a procedure by which the terms, conditions, and prices they obtain may be made known to GSA.

Evaluate the terms, conditions, and prices obtained by non-FSS users.

Examine the possibilities of, and develop procedures for making quantity procurements at lower unit costs.

Review Federal Supply Schedules with the purpose of improving content, terminology, format, and ease of use.

Examine, through negotiation procedures, the possibility of pricing software and training separately from equipment rental and purchase costs for ADPE and the communications interface.

Establish a committee of agency representatives to review any conflicts between Government and industry negotiators.

Review the use of Federal Supply Schedule terms by the agencies to assure proper use and proper terms.

Examine the practicality of bulk purchase of ADP supplies, such as cards, tapes, control panels, etc.

UTILIZATION, MAINTENANCE, REPLACEMENT, AND DISPOSAL

Review practices and policies of the Government in maintaining equipment and acquiring maintenance services. Review will include an assessment of inhouse-outhouse practices (stateside and overseas) and of manufacturers' experience in conducting a maintenance program.

Examine the necessity for and, if necessary, develop uniform maintenance and engineering change records which will remain with purchased equipment.

Develop a pilot contract to provide maintenance services for owned ADPE.

Identify and examine economic and technical factors concerning the replacement of equipment. Life probability, requirement probability, obsolescence probability, and compatibility factors will be included.

Review and improve CSA and DOD screening and re-utilization procedures. Title transfers and simultaneous screening will be examined and utilized to the maximum extent.

Examine storage requirements for ADPE in light of available storage capacity. Develop requirements and plans for storage of ADPE.

Review procedures concerned with the utilization of control panels, magnetic tapes, etc., to determine their adequacy.

Develop regulatory material for the utilization and disposal of punched card equipment (EAM).

Develop a reporting system which will provide statistical data on reporting transfers, release as surplus, donations, and sale of ADPE.

Develop and publish fire protection standards for computer installations.

MANAGEMENT SYSTEM DEVELOPMENT

Assist the Bureau of the Budget in the development and implementation of an ADP Management Information System (MIS).

Utilizing MIS data, develop criteria and analysis indicating overall program status, trends, and performance.

Program, operate, and maintain the ADP Management Information System. Produce required reports. (Presently BOB A-55).

Provide technical assistance to the Bureau of the Budget in developing criteria for readiness reviews, equipment selection procedures, common programs and application, and uniform rates for ADP services. Each effort, when started, will be a separate project in its own right.

Assist in the development of policies to cover the selection, acquisition, and utilization of ADP equipment and services by cost-type contractors.

Publish a Government-wide ADP Newsletter providing the latest developments in technology and agency program efforts.

ADP SHARING EXCHANGES AND SERVICES

Examine current methods of charging for work done through the sharing program and assist in the development of a uniform rate structure for ADP Services.

Develop and implement instructions and regulations concerning responsibilities for and operation of the sharing exchange program.

Indoctrinate and train exchange personnel.

Indoctrinate and gain support of Federal Executive Boards and various professional associations of Federal employees.

Examine the possibility of performing magnetic tape cleaning services on a centralized regional or national basis.

Examine the possibility of maintaining an emergency supply of tapes, cards, templates, etc., on a regional basis.

Examine ADPE and Communications resources and requirements in relation to Federal emergency planning.

Plan and install a pilot Data Processing Service Center. (NOTE: This project dependent upon BOB determination concerning Service Centers.

Plan and install a Data Communication Network to provide time sharing capability for project 670.01 (Data Processing Service Center).

Review working conditions at ADP Installations to assure the availability of police protection, transportation, and canteen facilities during "extra shift" operations.¹

Mr. Robert K. Brennan thinks that the future role of the General Services Administration in Automatic data processing management is generally misunderstood.² He points out that many people do not realize that Public Law 89-306 is an amendment to Title I of the Federal Property and Administrative Services Act of 1949, as Ammended, and that the activities of the General Services Administration under this ammendment will follow the traditional and accepted patterns long established under the basic law. The original "Brooks Bill" (H. R. 5171, 88th Cong. 1st Sess.) and "Douglas Bill" (S. 1577, 88th Cong. 1st Sess.) would have given the General Services Administration direct management and operational responsibilities; Public Law 89-306 maintains the Administration's traditional role of providing a staff service.

While specific procedures will probably not be established prior to 1967, they will be based on the general policy of evaluating the following sources of automatic data processing resources prior to any new acquisitions: (1) resources declared excess or surplus by other agencies (through the re-utilization screening process), (2) time sharing arrangements (through a regional sharing exchange), and (3) Government service centers.

¹General Services Administration, "Brief Project Statement," July 6, 1965, (staff memorandum).

²Interview with Robert K. Brennan.

The General Services Administration anticipates that the various agencies who have large automatic data processing facilities will operate the service centers in their geographic areas. Public Law 89-306, however, provides the General Services Administration with the authority and the funds to establish and operate such facilities when necessary. Actual operation of a system of giant service centers is probably two to five years away.

The National Bureau of Standards.--The National Bureau of Standards is responsible for: (1) developing uniform standards and criteria for managing and evaluating the Federal automatic data processing program and (2) providing advisory and consulting services to the agencies concerning system design, programming and computer utilization. These functions are carried out by the Center for Computer Sciences and Technology. Mr. Samuel N. Alexander, Technical Director of the Center, expects the Center to function in five broad areas.¹

The Office of Information Processing Standards will be established to develop a comprehensive body of programs and equipment standards, applicable to both Government and industry. This office will be comprised of a group of experts from industry, education and Government, supported by Government facilities and clerical help, who will be brought together for a period of time to solve specific standardization problems. Mr. Alexander thinks that the standardization problems are so

¹Interview with Samuel N. Alexander.

extensive and complex, and the personnel talent so limited, that this committee of the leaders in the various fields offers the most practical solution.

A Technical Information Exchange is to be established. This will be a combination library--reference service where complete "case studies" of data systems, from feasibility study to operating efficiency reviews, could be found. The Government automatic data processing managers, system analysts and designers and programmers would have easy access to the experiences of others working in their field and would, hopefully, be able to avoid the mistakes and take advantage of the results of work already completed. Comprehensive documentation of each step of system development and implementation is standard procedure throughout Government. To make the Technical Information Exchange effective, the documentation would have to include contractor, software and hardware performance, and a complete analysis of the benefits obtained and the problems encountered after the system was in operation. The Technical Information Exchange would provide at least a partial solution to the "information gaps" referred to in the Congressional Hearings and the Bureau of the Budget studies. It should also prevent some of the duplication of effort in system design and programming.

The Computer Services, Management Applications Planning, and Systems Research and Development Divisions will develop methods and criteria for evaluating performance within their

functional areas. The Center has gained broad experience through the operation of the Computer Service Center for the Washington area. This will provide a realistic basis on which to establish the criteria. Mr. Alexander pointed out that any changes brought about by establishing standards or criteria must be evaluated in terms of the technological difficulties involved and the costs to implement them. This information will have to come from the operating agencies. The Bureau of Standards will be able to evaluate technological difficulties; but the Bureau of the Budget will have to evaluate the cost factors.

The Information Processing Technology Division will be responsible for research and development in areas other than management applications. This division will also coordinate the research and development activities of the various agencies, and thus help eliminate another area of duplication.

The Information Sciences Division will serve as the intelligence arm of the Center for Computer Sciences and Technology. Advances in the state of the art are so rapid that a group of people "who speak the language" will be required just to keep the Center adequately informed.

The Civil Service Commission.--The Civil Service Commission is responsible, under Circular No. A-71, for the manpower management aspects of the automatic data processing program. This will include leadership and coordination of recruiting, classification, and training programs designed to provide

the manpower required. The Civil Service Commission established an Automatic Data Processing Management Training Center in 1965 "to prepare thousands of Federal managers to make the most of the computer's promise and potential for more efficient and economical Government operations."¹

Guidelines for Agency Action

The significance of the Report to the President.--The assignment of Government-wide automatic data processing management responsibilities was the first step towards effective management. The hiring and organizing of the staff personnel to carry out these responsibilities began in 1965 and is continuing at the present time. The consensus is that it will take from eight to eighteen months to organize the staffs, complete initial studies, and develop significantly improved policy guidance for the operating agencies. Thus, the 1965 Bureau of the Budget Report to the President is the clearest indication of future automatic data processing guidelines. Mr. Clark R. Renninger stated that this report will be the basic guideline for staff studies and management policies during the initial stages--probably for the next three or four years.²

Information for managing automatic data processing activities.--The greatest paradox in the entire automatic data processing management field is the lack of accurate, comprehensive

¹Robert B. Lewis, "Inside Government," The Federal Accountant, XV (Fall, 1965), p. 146.

²Interview with Clark R. Renninger, ADP Management Branch, Office of Management and Organization, Bureau of the Budget, February, 1966.

and timely information. The most important benefits that automatic data processing has provided other management systems are absent from its own management system. Bureau of the Budget Circular No. A-55, Annual Report on the Utilization of Automatic Data Processing Equipment in the Executive Branch, is the current Federal reporting guideline. The Report to the President describes the required annual reports as "status reports" and states that they do not provide the information necessary to improve Federal automatic data processing management. The report specifically mentions the lack of information concerning: (1) manufacturer's performance, (2) the amount of commercial contractor services that the Government uses and the reasons why such services were used, (3) the precise location and kind of services available within the Government, together with an indication of the times they are available and their cost, and (4) the automatic data processing operations of Government cost-reimbursement contractors.

Circular A-55 (Revised March 9, 1966) requires annual inventory reports from all departments and agencies that operate or plan to operate electronic digital computers, including punched-card computers such as UNIVAC 1004 and IBM 1401G. Information on Government contractors, operating on a cost reimbursement basis, must be included if (a) the contractor acquired the equipment to perform his contractual obligations, or (b) the equipment is furnished by the Government, or (c) the equipment is installed in a Government owned, contractor operated

facility. The information includes the model designation of the equipment, the cost, whether it is purchased or leased and the average hours in service. The report covers the past year, the current year and the following two years. Commercially-available computers that are used for other than data processing applications are exempt from the average hours-in-service reporting requirement. Commercially-available computers that have been modified or computers built to special Government specifications are also exempt from the average hours in service reporting requirement and are exempt from all reporting requirements if they are used in a weapons systems.

An annual report of computer (time) utilization is also required to supplement the inventory report. Those installations exempt from the hours in service reporting requirement are likewise exempt from the utilization reporting requirement. This report is based on 720 hours (24 hours X 30 days) per month of equipment time available. The average number of hours per month devoted to the following categories, for the months of October, November and December preceeding the report, must be shown: (1) hours out of service due to (a) preventive maintenance or (b) remedial maintenance; (2) hours in service applied to (a) effective production (b) re-runs (c) program development and (d) set up; and (3) residual time, classified as (a) available to others and (b) not available to others. The "clock time" of the residual time available to others and the reason the residual time is not available to others must also

be stated.

In addition to the inventory and utilization reports, annual automatic data processing cost reports are required covering the past year, the present year and the following year. Organizations that are required to furnish inventory and utilization information are required to report: (1) ADP personnel man years, salaries, rental costs of computers and supporting equipment, cost of contractual services, other operating costs, computer purchase cost, other equipment purchase costs and the cost of site preparation. ADP organizations that do not operate computers must report: man years, capital costs, operating costs and contractual services costs. Non-ADP organizations must report contractual services costs. Contractual services costs are classified as data processing, system design and programming, and maintenance of owned equipment. They are further classified as to source; either Government or non Government. In addition, the man years and salaries of ADP staffs, that are not associated with a specific ADP organization, must be reported on a separate schedule.

The latest revision (March 9, 1966) to Circular A-55, in addition to extending the coverage of the reports to include cost type contractors, when less than the full cost of the ADP unit was paid for by the Government, and to include punched-card oriented equipment, requires a Summary Report of ADP Plans. This report will be submitted each quarter beginning April 1,

1966 and will include the following information for each of the following four quarters: (1) number of computers installed at the beginning of the quarter, (2) number of computers to be installed during the quarter, (3) number of computers to be removed during the quarter, (4) number of leased computers to be purchased during the quarter, (5) number of computers to be installed at the end of the quarter, (6) number of computers for which a solicitation of proposal will be made during the quarter, and (7) the number of computers for which a selection will be made during the quarter.

A more adequate management information system is being developed. The March 9th revision was only the first step. The improved system will closely follow the recommendations made in the 1965 Report to the President which suggested that: ". . .it should cover the following broad categories of information:

1. Equipment.

- (a) Equipment configuration in use, by component.
- (b) Ownership status.
- (c) Plans for additions, replacements, or modifications.
- (d) Availability of related equipment, such as communication facilities.
- (e) Maintenance and performance.

2. Software.

- (a) Program language compilers.
- (b) Assembly programs.
- (c) Monitors.
- (d) Special programs.

3. Utilization.

- (a) Purposes for which equipment is used.
- (b) Analysis of operating time, including time shared.

- (c) Analysis of unused time.
- 4. Sharing.
 - (a) Conditions to be met by potential users.
 - (b) Assistance available to users.
 - (c) Charges.
- 5. Costs.
 - (a) Incurred by major cost elements.
 - (b) Budget requirements.
- 6. Personnel.
 - (a) Currently employed (by occupational classification).
 - (b) Projected requirements.
 - (c) Training needs.
- 7. Services contracted out.
 - (a) Purpose.
 - (b) Cost.
- 8. Administration of purchase, rental, and maintenance contracts.
 - (a) Problem.
 - (b) Suggestions for improvement and clarification.
- 9. Accomplishments.
 - (a) Improvements in mission performance.
 - (b) Reductions in costs.
 - (c) Manpower reductions and placements.
 - (d) Plans for the future.¹

Classification of computer installations for management review.--Chapter I and Appendix A indicate the broad range of computer applications within the Federal Government. The Report to the President looks beyond the particular application classifications and suggests that automatic data processing management criteria should be based on the environmental and time response requirements that underlie the application classifications. Exhibit 15 (page 95) shows the classifications suggested by the Report to the President. The report also notes

¹Senate Committee on Government Operations, Report to the President. . . , p. 66.

that while computer cost may be useful in setting management thresholds for higher level review, it is not a useful distinction for setting uniform management criteria.

Obtaining the maximum benefits from automatic data processing resources.---The effectiveness of automatic data processing systems, like other management tools, depends on adequate planning and continual evaluation. The Report to the President recommends that:

1. The Bureau of the Budget will develop a broadly based program of continuous evaluation of computer systems, to provide an assessment of accomplishments and to serve as a recurring source of information for the development or revision of policies and guidelines. The responsibility for conducting evaluations and preparing appropriate reports will rest with the agency heads, in accordance with their normal management responsibilities.

2. The Bureau of the Budget will develop criteria to assist in evaluating both systems design and various aspects of system performance.

3. Agencies should develop master data processing plans at appropriate levels, to serve as guides in the orderly development of systems and to assure the most effective use of staff resources available for that development.

4. The Department of Commerce, through the National Bureau of Standards, should expand the advisory services currently being provided to agencies in the analysis and design of computer-based systems. Its resources allocated for this purpose should be increased to the extent required to meet such needs as fully as possible.¹

Bureau of the Budget Circular No. A-61, Guidelines for Appraising Agency Practices in the Management of Automatic Data Processing (ADP) Equipment in Federal Agencies, recommends that a central automatic data processing authority be established,

¹Ibid., p. 18.

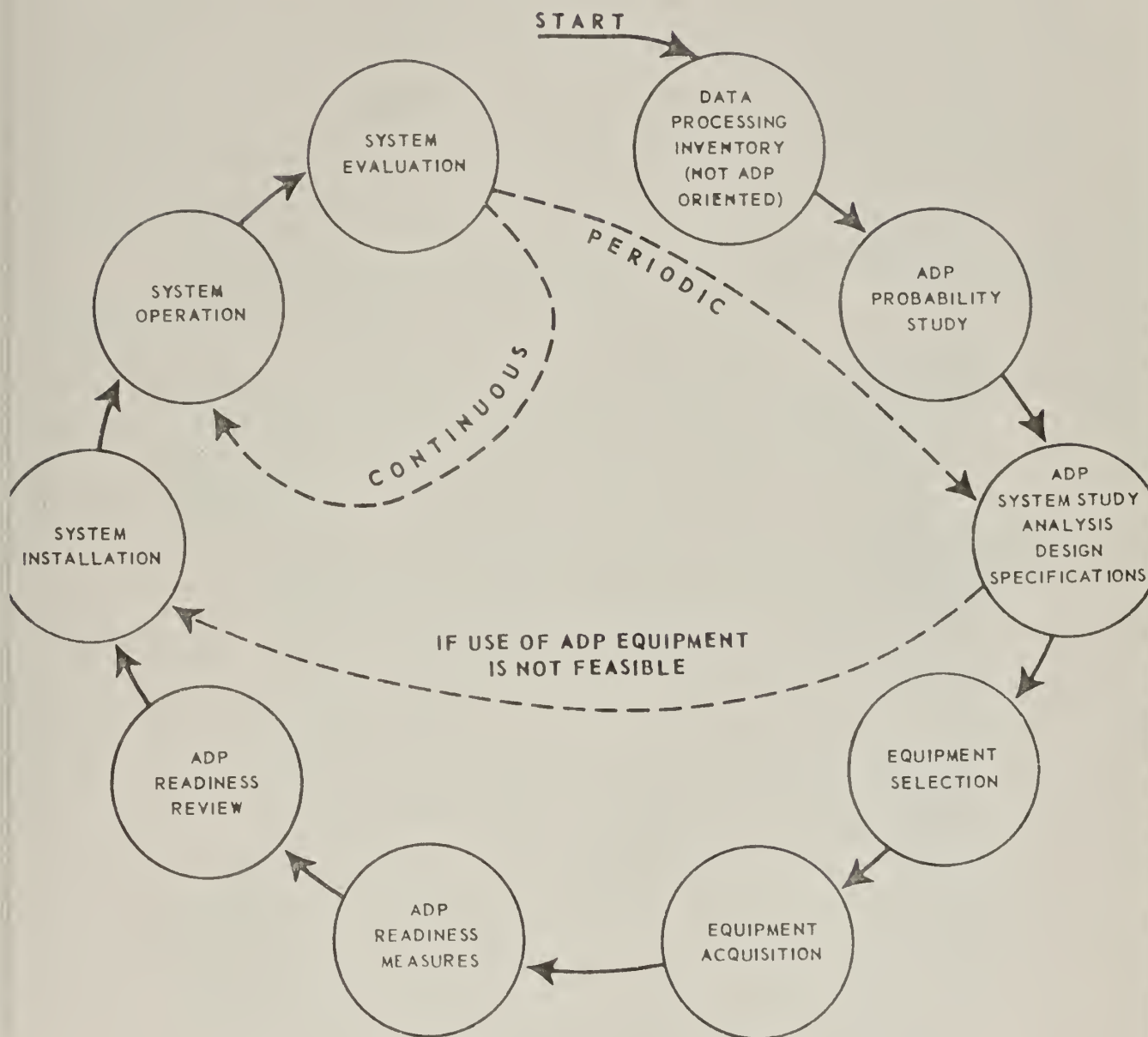
at a high level, within each of the departments and agencies. This authority would establish policy and priorities, coordinate and stimulate agency wide systems, and promote time-sharing. Exhibit 4 outlines the recommended management program. Bureau of the Budget Bulletin No. 60-6, Automatic Data Processing (ADP) Program of the Executive Branch: Studies Preceding the Acquisition of ADP Equipment, provides detailed recommendations concerning the "ADP Probability Study" and "ADP Systems Study." Specific criteria to appraise system design and system performance are under study at the National Bureau of Standards.

Equipment selection.--Bureau of the Budget Circular No. A-54, Policies on Selection and Acquisition of Automatic Data Processing (ADP) Equipment, contains the current Federal Government selection and acquisition guidelines. It is applicable to all electronic digital computers, peripheral and auxiliary equipment, punched-card equipment, and data transmission and communication equipment used primarily in connection with an electronic computer. It applies to all Government equipment purchases and to cost-type contractor's purchases used solely for Government data processing.

Circular A-54 requires that selections be made on the basis of system specifications, developed in the preceding systems analysis and design phase. The system specifications must state the objectives of the system, the data processing requirements (inputs, outputs, data files, and processing

Exhibit 4

THE DATA PROCESSING MANAGEMENT CYCLE



Source: Bureau of the Budget Circular No. A-61.

frequencies and timing), and the equipment capabilities required. The actual selection may be based on an "in-house" evaluation of manufacturers' literature, or it may be based on specific equipment proposals submitted by the manufacturers. In either case, all manufacturers, who can meet the specifications, must be accorded equal opportunity and selection decisions must be documented. The capability of the equipment to fulfill the system requirements and the installation and operating costs are the two primary selection criteria.

The Report to the President makes the following recommendations concerning the selection process:

1. The Bureau of the Budget will provide for the publication of criteria, guidelines, or regulations covering the selection of electronic data-processing equipment. It will do this through new issuances, covering the following subjects:

- (a) The preparation of system specifications, including benchmark problems, to be furnished equipment suppliers in requests for proposals.
- (b) Evaluation of suppliers' proposals.
- (c) Compatibility considerations.
- (d) Consideration of excess and surplus equipment.
- (e) Distinctions to be made between additions, replacements, and modifications when selection policies and criteria are applied.
- (f) Interagency sharing of experiences in the selection and performance of equipment.

2. The General Services Administration should maintain current data on the characteristics and performance capabilities of all items of commercially available general-purpose electronic data-processing equipment that are (a) currently in place in the Government, (b) available from suppliers, and (c) scheduled to become available from suppliers. Based on this data, GSA should provide comparative information to agencies on request.

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3. The General Services Administration should gather and make available to executive agencies on request information on the performance of the firms that supply electronic data-processing equipment and programming aids to the agencies.¹

Acquisition of equipment and supporting services.--

Equipment acquisition is the most controversial subject in Government automatic data processing management. The two principle areas of discussion are: (1) the decision to buy or lease equipment and (2) the appropriate means to improve acquisition contract provisions.

Exhibit 5 shows the number of computers purchased and leased by the Federal Government since 1959. Circular A-54 provided the first buy vs. lease guidelines in October 1961. It states that:

(1) The purchase method is preferred when all of the following conditions exist:

(a) The system study which preceded the selection of the equipment has established a reasonable expectancy that the ADP equipment under consideration can be successfully and advantageously used.

(b) A comparative cost analysis of the alternative methods of acquisition, of the types illustrated by Attachments A and B, indicates that a cost advantage can be obtained by the purchase method in six years or less after the date of delivery. This analysis usually will include the following cost elements under each method: for the lease method--rental costs, including maintenance; for the purchase method--purchase costs, including purchase price, maintenance, and other one-time costs applicable only to purchase; for the lease-with-option-to-purchase method--rental costs, and purchase costs less credits applicable upon purchase. In addition to the cost elements described above, the residual value of equipment to the Federal Government will be considered as a

¹Ibid., p. 26.

Number of Computers Purchased and Leased

Status as of June 30 Each Fiscal Year

2451

2188

LEASED

1862

50.8

1246

54.8

1200

1326

60.3%

1122

1030

78.7%

730

1044

83.3%

531

855

81.5%

433

617

84.6%

403

323

80.2%

380

19.2%

1959

1960

1961

1962

1963

1964

1965

1966

Estimate

The percentage of purchased computers increased from 39.7 percent in fiscal year 1964 to 45.2 percent in fiscal year 1965. A further increase to 49.2 percent is anticipated for fiscal year 1966.

Decisions to purchase or lease computers are based on the probable length of time the equipment can be used advantageously and the comparative costs of purchase or rental for that period. Consideration must be given to such factors as future program and workload requirements, estimated hours of computer utilization per month, the relationship established by the manufacturer between purchase and rental prices, and potential improvements in computer technology. Because the circumstances related to these factors are often subject to frequent and rapid change, projections regarding the percentage of computers that will be purchased or leased are difficult to make and are subject to change.

Source: Inventory of Automatic Data Processing Equipment in the Federal Government, Bureau of the Budget, June, 1965.

Exhibit 5

For the major users of computers, the number of computers purchased and leased is as follows:

	Defense	NASA	AEC	Treasury	All other
Fiscal year 1964:					
Number of computers...	1,257	203	168	46	18
Number purchased...	450	55	100	4	1
Percent purchased...	36	27	65	32	38
Fiscal year 1965:					
Number of computers...	1,497	251	183	45	29
Number purchased...	582	128	141	43	34
Percent purchased...	39	51	77	90	45
Fiscal year 1966:					
Number of computers...	1,683	298	189	57	24
Number purchased...	680	181	105	50	129
Percent purchased...	40	61	87	88	57

factor in a comparative cost analysis. Trade-in allowances quoted by manufacturers may be used as a representation of the residual value.

(c) The capabilities of the ADP equipment will continue to be needed and will be sufficient to satisfy the system requirements, current and projected, for a period beyond the point in time at which the purchase method begins to provide a cost advantage. The possibility that future technological advances will render the selected equipment comparatively obsolete before the cost advantage point is reached should not rule out purchase if the selected equipment is expected to be able to satisfy the system requirements.

(2) The lease-with-option-to-purchase method is indicated when it is necessary or advantageous to proceed with the acquisition of the equipment that meets system specifications, but it is desirable to defer temporarily a decision on purchase because circumstances do not fully satisfy the conditions which would indicate purchase. This situation might arise when it is determined that a short period of operational experience is desirable to prove the validity of a system design on which there is no previous experience, or where decisions which might substantially alter the system specifications are imminent.

(3) The lease method, without option to purchase, is indicated only when it is necessary or advantageous to proceed with the acquisition of equipment that meets system specifications and it has been established conclusively that any one of the conditions under which purchase is indicated is not attainable.¹

Circular No. A-61 suggests that the usefulness of the equipment to the agency as a whole should be considered. Thus in determining the useful life of the equipment possible secondary users within the agency should be anticipated.

The General Accounting Office has been the most consistent proponent for increased Government purchasing. GAO proposes that each component of a system be analyzed separately

¹U. S. Bureau of the Budget, Circular A-54, Policies on Selection and Acquisition of Automatic Data Processing (ADP) Equipment, October, 1961, pp. 3-4.

and that all potential secondary users throughout the Federal Government be considered. GAO's March 1963 report to the Congress concludes that:

1. If possible and substantial savings are to be fully realized, management decisions as to whether data processing equipment should be purchased or leased should be made from the standpoint of advantage to the Government as a whole and not from the standpoint of the individual using agencies.

2. Because of the substantial savings that may be available, all decisions to acquire the use of data processing equipment should be supported by specific computations showing the comparative costs of acquiring by lease and by purchase.

3. Where purchasing is financially advantageous, the realizable savings increased in proportion with the increase in utilization of the machines.

4. The savings possible through purchasing are more pronounced for the larger and more complex machine systems.

5. While significant savings may be realizable in many instances through purchasing rather than leasing, for some types of electromechanical equipment, it is more advantageous financially to lease rather than to purchase.¹

The Report to the President recommends that:

1. Present policy and criteria governing the decision to buy or rent should be continued, except that the cost of money should be included as a factor in cost comparisons. Provision also should be made for a general suspension of purchase activity in respect to certain computer models when it becomes evident that superior equipment is about to become available, or when potential excesses of Government-owned equipment are sufficiently imminent to warrant only the temporary rental of equipment, pending the availability of such excesses.

2. Agency heads should take appropriate steps to

¹U. S. Comptroller General, Study of Financial Advantages of Purchasing Over Leasing of Electronic Data Processing Equipment in the Federal Government, March, 1963, p. 37.

assure that decisions to rent equipment remain under constant review, and that prompt action is taken to purchase the equipment if, in accordance with published criteria, it becomes advantageous to do so.

3. To avoid use of equipment beyond the point of economic advantage to the Government, the General Services Administration should develop and publish guidelines and criteria governing the replacement of equipment.

4. The General Services Administration should also--

- (a) Undertake a comprehensive study of the alternatives for providing adequate maintenance of computer equipment--a study that would lead to the establishment of appropriate policies, guidelines, and practices;
- (b) Develop and publish criteria for evaluating the quality of maintenance;
- (c) Provide guidance to assure that accurate and detailed records are kept on all maintenance performed on Government-owned equipment;
- (d) Give immediate attention to the problems, as outlined in this chapter, with respect to the utilization of excess and disposal of surplus ADP equipment.¹

The General Services Administration negotiates Government-wide automatic data processing equipment contracts. These contracts include provisions for equipment and supporting services (software). The Report to the President recommends that the contracting procedures and the contract terms could be improved by the following:

- 1. Establishing firm deadlines so that negotiations would not extend beyond the June 30 expiration date.
- 2. Volume discounts should be sought where the volume of sales to the Government warrants.

¹Senate Committee on Government Operations, Report to the President. . . , pp. 39-40.

These items represent some of the most important
aspects of the work of the Commission and are
being presented to you for your information and
guidance.

The items are arranged in the order in which
they were received by the Commission and are
being presented to you in the order in which
they were received by the Commission.

- (A) The Commission has received a report from the
Director of the Bureau of the Census, dated
January 1, 1964, regarding the results of
the 1960 Census of the United States. The
report contains a summary of the results of
the census and a detailed analysis of the
data.
- (B) The Commission has received a report from the
Director of the Bureau of the Census, dated
January 1, 1964, regarding the results of
the 1960 Census of the United States. The
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Director of the Bureau of the Census, dated
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the 1960 Census of the United States. The
report contains a summary of the results of
the census and a detailed analysis of the
data.

3. Rental contracts should cover several years.
4. Extra use charges should be eliminated from rental contracts.
5. Supporting services provisions should be more explicit.
6. The deposit provision should be eliminated from all lease with the option to buy contracts.
7. Better procedures for reporting deviations from contract terms should be established.¹

House Report No. 802 states the basic difficulty in implementing these recommendations: ". . . though volume acquisition should inherently place the Government in a stronger bargaining position and lead to volume discounts, as a matter of practice under the present disjointed agency-by-agency system of Government ADP Management, the Government has hardly any bargaining position at all."² The report later describes the contracts as a "hunting liscense" which enables the manufacturers to search for potential Government users. This is also the General Accounting Office's basic reason for recommending the central management office concept.

Public Law 89-306 attempts to solve this difficulty by applying the "single purchaser" concept. A revolving fund was established, under General Services Administration management. House Report No. 802 describes the operation of this "single purchaser" concept as follows:

¹Ibid., pp. 43-45.

²House Committee on Government Operations, Automatic Data Processing Equipment, p. 26.

Under this arrangement, GSA would have all of the Government's general purpose ADP acquisition money in its pocket and would be in a position, once all aspects of the coordinating program have been fully implemented so that adequate information of prospective Government agency requirements is available, to offer ADP manufacturers firm contracts for specific amounts of ADP equipment. In turn, GSA could reasonably expect to receive some reduction in purchase and lease prices reflecting the magnitude of the Government's acquisition.

The revolving fund established under H. R. 4845 would be primed with capital appropriated directly by Congress and augmented by the unamortized value of the general purpose equipment now in Government agencies which the Government has purchased. GSA would use these funds to acquire by lease or purchase the ADP needed to fulfill the requirements of the various agencies.

Essentially, all Federal agencies would lease equipment from the GSA revolving fund. So far as the agencies are concerned, only the budgetary personnel would know the difference. GSA would acquire the ADP systems selected by the management of the agencies. The agencies would use the equipment as long as they wished, in any manner they saw fit, subject to the general policy and fiscal control of the Bureau of the Budget, the President, and the Congress as normally applied to all agency operations.¹

Public Law 89-306 specifically prohibits the General Services Administration from interfering with or controlling agency equipment selection or utilization. Thus, the functions of selection and acquisition are separate. Under this arrangement it is difficult to see how a manufacturer would have any real incentive to negotiate with GSA after the agency had made its selection.

Mr. Robert Brennan sees the GSA in the role of providing the agencies with an opportunity to obtain the benefits of centralized purchasing. If they do not wish to avail themselves

¹Ibid., p. 30.

The first of these is the fact that the
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of the service, it will be up to them to justify their actions to the Bureau of the Budget and the Congress. One means to bring selection and acquisition closer together would be for the agencies to present several acceptable manufacturers' equipment proposals to GSA. GSA could then pool several agency requests and be in a better position to negotiate more favorable terms.¹

Sharing Automatic Data Processing Resources.---The benefits of sharing unused computer capacity rather than acquiring new capacity are obvious. The Report to the President indicates that roughly 680,000 hours of computer time were available for sharing during 1964.² Exhibit 5 shows average computer utilization. In addition to computer time, other services such as system analysis and design and programming resources have a sharing potential. As has been previously indicated, the General Services Administration has established twelve Regional Sharing Exchanges under the provisions of Bureau of the Budget Circular No. A-27. The Exchanges provide information on services available. The first exchange was established in Philadelphia on an experimental basis. The report concerning its operation stated:

1. Sharing among agencies in the area has increased to over five times that in effect prior to the test.

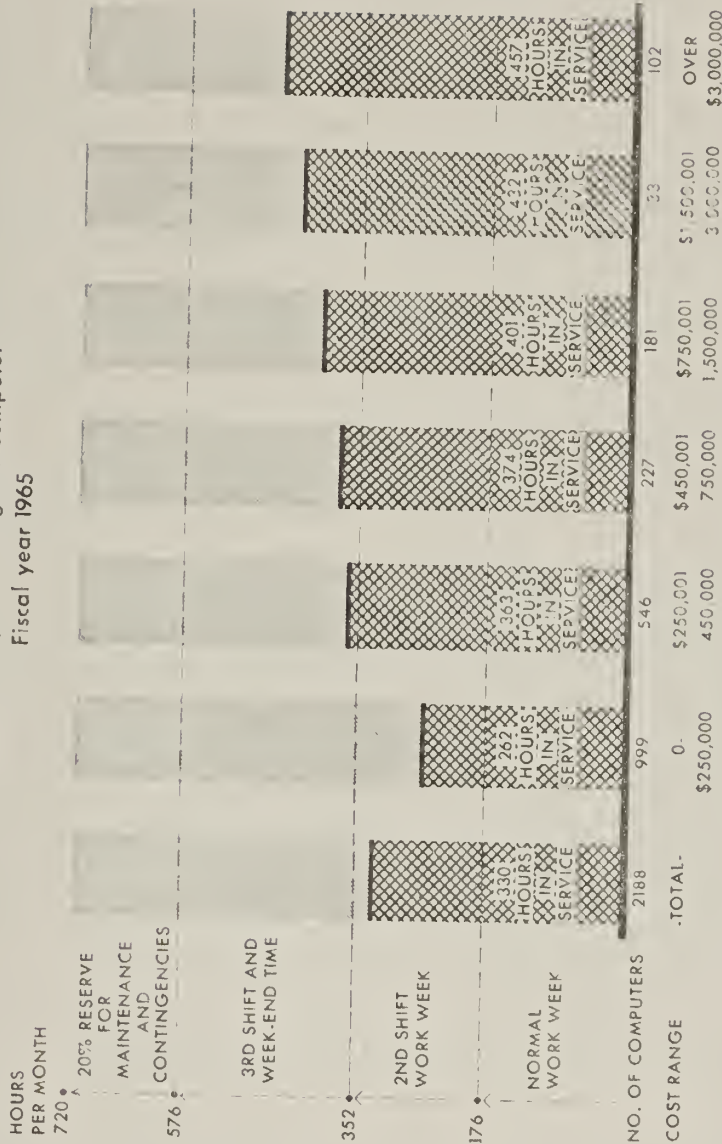
2. The volume of computer services provided by the agencies in the area during the tests represents about 14 per cent of the equipment time reasonably available.

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¹Interview with Robert K. Brennan.

²Senate Committee on Government Operations, Report to the President. . . , p. 19.

Average Hours Per Month in Service Total and By Cost Range of Computer Fiscal year 1965



Computers are in service an average of 330 hours per month, up from 313 hours in 1964 and 285 hours in 1963. The average ranges from 262 hours for the small, low-cost computers to 457 hours for the largest and most expensive. The smaller computers often serve as (a) support facilities for larger computing systems, (b) onsite computational facilities readily available on demand for use by scientific and engineering personnel, or (c) the primary data processing facility for relatively small administrative-type applications. These purposes usually do not lend themselves to long, sustained periods of operation of the kind encountered with the larger, more powerful computers which are applied to the solution of complex scientific problems or large-

scale operating programs involving the processing of great volumes of records and reports.

Note that the average utilization of computers is greater than the equivalent of a two-shift or 16-hour workday in all cost ranges except the smallest. On the average, the time available for additional use of these computers represents third-shift and weekend time, which includes a 20-percent reserve for workload contingencies and the performance of preventive and remedial maintenance.

The term "hours in service" is defined as time devoted to effective production, program reruns, program development, and operating preparation (set-up). It excludes time required for preventive and remedial maintenance.

Source: Inventory of Automatic Data Processing Equipment in the Federal Government, Bureau of the Budget, June, 1965.

8. The major deterrents to sharing are incompatibility of computers, a shortage of systems analysis and programming services, and inconvenient periods of time for computer use.¹

The Computer Service Center, which differs from a Sharing Exchange in that the customers come directly to the center for their data processing needs, has encountered these same shortages of systems analysis and programming services. In addition the policy of charging the same rate for services, no matter on which shift they are performed, has caused scheduling difficulties.² The National Bureau of Standards also provides Sharing Exchange Services in conjunction with its Computer Service Center.

The Report to the President makes the following recommendations concerning sharing:

1. The Bureau of the Budget will establish an interagency group to study and develop cost principles to be applied uniformly by agencies in establishing prices for shared computer time and services.

2. The Bureau of the Budget will continue its evaluation of the service center concept to determine a proper course of action to be taken.

3. The Bureau of the Budget will, with the assistance of the major agencies concerned, undertake a study of the problems associated with the use of contractor organizations for providing services related to electronic data processing activities, with a view toward developing policies, guidelines, or actions that the study may indicate are needed.³

Standardization of equipment and techniques.--The present

¹U. S. Bureau of the Budget, Evaluation of the Experimental Regional Sharing Plan for Electronic Computers, March, 1964, p. iii.

²Interview with Samuel N. Alexander.

³Senate Committee on Government Operations, Report to the President. . . , p. 22.

standardization difficulties are a product of the extremely rapid technological advances in automatic data processing equipment and the manufacturers' desire to offer something better and thus gain a competitive advantage. The users or customers were not particularly interested in standardization until it became desirable to combine several sub-systems into an integrated or total system. Transfer of information between systems could only be accomplished by an expensive conversion process, and even then, the data elements and the codes that represent the data elements have different meanings in different systems.

The Report to the President points out that present degree of non-standardization adversely effects the automatic data processing effort by: (1) severely limiting the capability to share equipment, programs and the services of trained personnel, (2) limiting the re-utilization of excess equipment, (3) increasing the costs of system design, programming, and interchange of machine sensible information, and (4) making the arrangements for emergency back-up facilities more difficult.

The Report to the President recommends that equipment compatibility, rather than computer standardization should be the goal. This will allow the maximum opportunity for technological advances and still give the users most of the advantages of standardization. Compatibility can be attained by: (1) developing common program languages (such as COBOL and FORTRAN)

for man-to-computer communications, (2) using the American Standard Code for Information Interchange for computer to computer communication, and (3) developing a system of standard data elements and codes. The use of standards approved by the American Standards Association offers greater long-term benefits than Federal standards. The Bureau of the Budget has the overall responsibility for the standardization program and particularly for the standard data elements and codes program. Appendix C lists the current American Standards Association, Federal, and Department of Defense data elements and codes standardization categories.

Government Contractor Relationships.--As was indicated in Chapter I, about one-third of the computers funded by the Government are owned and/or operated by cost-type contractors. A major management problem in this area, namely the lack of information concerning such installations, should be alleviated by the latest revision of Bureau of the Budget Circular No. A-55.¹

The General Accounting Office recommends the same management system for cost-type contractors that it recommends for Government in-house automatic data processing. The Defense Department is particularly critical of this suggestion because the Department feels that this would lead to eventual Government ownership of all such computers; and this runs counter to Defense's general policy requiring contractors to provide their

¹Refer to page 37-38 for complete discussion.

own facilities. The Department of Defense solution to the problem is to limit rental cost reimbursement to the cost of purchasing the computer, if purchasing was shown to be more advantageous.¹

The House Committee on Government Operations exempted Government Contractors from the provisions of Public Law 89-306 on the recommendations of several industry groups. Eight members of the Committee, however, indicated that the question was still open by stating:

The industries' persuasive arguments were presented in the full committee meeting and the amendments were adopted. We found these arguments too plausible to be completely ignored and we voted for the amendments. However, our vote was less an endorsement of any industry position than it was a vote to postpone the inclusion of private contractors under such legislation until the points of difference can be resolved or until their views are more thoroughly examined in the appropriate forum--committee hearings.²

The Report to the President recommends:

1. The Bureau of the Budget will revise its current policies to provide that (a) established criteria with respect to the purchase or rental of automatic data processing equipment shall be applied in determining costs to be reimbursed under cost-reimbursement type of contracts, and (b) agencies will include equipment operated by their cost-reimbursement type of contractors in intra-agency sharing arrangements.

2. The Bureau of the Budget, in cooperation with the Department of Defense, National Aeronautics and Space Administration, Atomic Energy Commission, General Services Administration, and other agencies will undertake the development of reporting procedures

¹Senate Committee on Government Operations, Report to the President. . . , pp. 97-99.

²House Committee on Government Operations, Automatic Data Processing Equipment, p. 77.

The following is a summary of the information received from the various sources mentioned in the report. It is to be understood that the information is not necessarily complete and that it is subject to change as more information is received.

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to obtain an inventory, together with related data on costs, of automatic data processing equipment and services provided under cost-reimbursement type of contracts. This information should be incorporated in the ADP management information system recommended in Chapter 10.

3. The Department of Defense should make effective at the earliest practicable date the proposed amendment to the Armed Services Procurement Regulations on "Rental Costs." This regulation also should be adopted by the National Aeronautics and Space Administration.

4. The General Services Administration should clarify and amend its existing regulations relating to the utilization of excess equipment to emphasize the importance of those provisions which now require that contracting agencies make excess Government ADP equipment available to cost-reimbursement type of contractors when such equipment will satisfy their needs.¹

Immediate agency action.--The preceding recommendations are not new and, in fact, may never become official automatic data processing management policy. They do indicate the parameters of the problems and the current avenues of study aimed at solving these problems. Automatic data processing managers in the various agencies would be well advised to review their management programs and evaluate the impact that the adoption of these recommendations might have on their operations.

¹Senate Committee on Government Operations, Report to the President. . . , pp. 60-61.

CHAPTER III

THE DEPARTMENT OF THE NAVY MANAGEMENT INFORMATION AND DATA SYSTEMS PROGRAM

Objectives, Organization and Application

Objectives of the Navy Management Information and Data Systems Program (MIDSP).---The primary objective of the MIDSP is an integrated management information system that will fulfill the requirements of the decision makers at all organizational levels. This will constitute the Navy contribution to the Department of Defense "resource management system" described by Assistant Secretary of Defense (Comptroller) Anthony.¹

A recent article by the Director and Assistant Director of the Systems Development Division of the Navy Office of Management Information stated the general approach to this objective as follows:

. . .The specifications of objectives, allocation of resources, establishment of priorities, development of standards, identification of ultimate management information needs and the resolution of any and all lower level conflicts can only proceed via the high road from top management.

. . .Only top management knows its sense of responsibilities, and knows its expectations as to its future goals. And only top management knows what it already knows, and what it needs and wants to know. . . .This is why systems planning must proceed centrally from the topmost management level.

On the other hand, fulfillment of information requirements, the generation and development of the actual data base, the actual system design can best (if not only) be evolved via a bottom to top approach

¹Robert N. Anthony, "What's Ahead," The Armed Forces Comptroller, XI (January, 1966), pp. 2-5.

. . .most importantly, this enables the construction of a sound information system by starting at the information sources.¹

The Navy policy is to provide ". . .the proper coordination of management information and data systems without limiting the fundamental responsibilities of the heads of Departmental components for the development of management information and data systems.² The fact that about 95 per cent of the management information systems will be automated³ makes automatic data processing considerations extremely important.

Vast resources are required to develop, implement and operate automatic data processing systems. Equipment is expensive and there is a severe shortage of trained personnel. The second objective of MIDSP is the efficient use of these resources in all automatic data processing systems. This requires the elimination of duplicate effort, compatibility between systems and equipment and efficient acquisition and optimum utilization of equipment.

The general organizational pattern and philosophy.--The Department of the Navy Management Information and Data Systems Program is characterized by a greater degree of decentralized decision making authority than is the case in the programs of

¹W. Henry Hill and Jack H. Wright, "Concept and Design of Integrated Management Information Systems," Data Processing Year Book, 1964, p. 117.

²U. S. Department of the Navy, Office of the Secretary, Management Information and Data Systems; Plans and Procedures for Coordination of, Instruction 5200.14, November 3, 1965, p 3.

³E. H. Kuhl, Director, Systems Development Division, Office of Management Information, Department of the Navy, Presentation to the Navy Graduate Financial Management Class, The George Washington University, January 12, 1966.

the other military services. The program is considered to be primarily a line function, and appropriate responsibilities and authority are vested in the departmental operating executives. A significant degree of coordination and direction, however, is provided by a central staff authority. Authority and responsibility, for both the information systems and the resources required to develop and support the systems, are vested in a single manager within each Departmental component. This common responsibility and this authority provide excellent accountability.

The Navy ADP Policy Official.--A Department of Defense Directive¹ requires the Secretaries of the Military Departments to designate a "Senior ADP Policy Official" to serve as the focal point for ADP administration, and to be the approving authority for automatic data processing equipment selection and acquisition. This approval authority may not be delegated with respect to computer main frames. The Secretary of the Navy has designated a Special Assistant to serve in this capacity. Staff support for the ADP Policy Official is provided by the Office of Management Information (OMI).

Two of OMI's three divisions provide this staff support. The Systems Development Division is responsible for: (1) establishing policies, procedures and criteria for Navy management information systems, (2) monitoring and coordinating

¹U. S. Department of Defense, Responsibilities for the Administration of Automatic Data Processing Equipment Program, Directive 5100.40, September 28, 1963, pp. 4-5.

system development, (3) insuring systems compatibility, and (4) administering the Standard Data Elements and Codes Program. The Systems Automation Division is responsible for: (1) developing policies, procedures and criteria for the Navy Automatic Data Processing Equipment Program, (2) standardizing ADP equipment, languages and operations, and (3) evaluating automatic data processing equipment selections and installations.¹

The Operating Executives Organization.--The operating executives for purposes of MIDSP management are:

The Chief of Naval Operations (CNO), Commandant of the Marine Corps (CMC), Chief of Naval Material (CNM), Deputy Comptroller of the Navy (DCN), Chief of Naval Research (CNR), Chief of Naval Personnel (CNP), and the Chief of the Bureau of Medicine and Surgery (CBMS). In fulfilling this responsibility these officials will be guided and governed by the policies and procedures promulgated by the Department of the Navy ADP Policy Official.²

The Chief of Naval Material is head of the Naval Material Support Establishment which includes the Bureaus of Ships, Weapons, Supplies and Accounts and Yards and Docks. Exhibit 7 shows the MIDSP organization (MAT 14) for the Office of Naval Material. Exhibits 8 through 13 portray the MIDSP organization in the Bureau of Naval Weapons, the largest computer user in the Department of the Navy.

(Refer to Exhibits 8 and 9)

The Data Systems Officer is responsible for providing direction, planning, coordination and staff

¹Mr. E. H. Kuhl, Presentation to the Navy Graduate Financial Management Class.

²U. S. Department of the Navy, Office of the Secretary, Automatic Data Processing Equipment Program, Inst. P10462.7A ch. 3, February, 1964, p. iv-1.

supervision of data systems programs, policies procedures, resources, research, and operations for the Naval Weapons Establishment.

.....
The Indoctrination and Training Specialist (DS-12) is responsible for planning and directing the ADP training program for indoctrinating Bureau personnel in all phases of automatic data processing.

.....
The Budget and Fiscal Planning Assistant (DS-2) is responsible for the coordination and accomplishment of budget planning and budget services for the Data Systems Office.¹

(Refer to Exhibits 9 and 10)

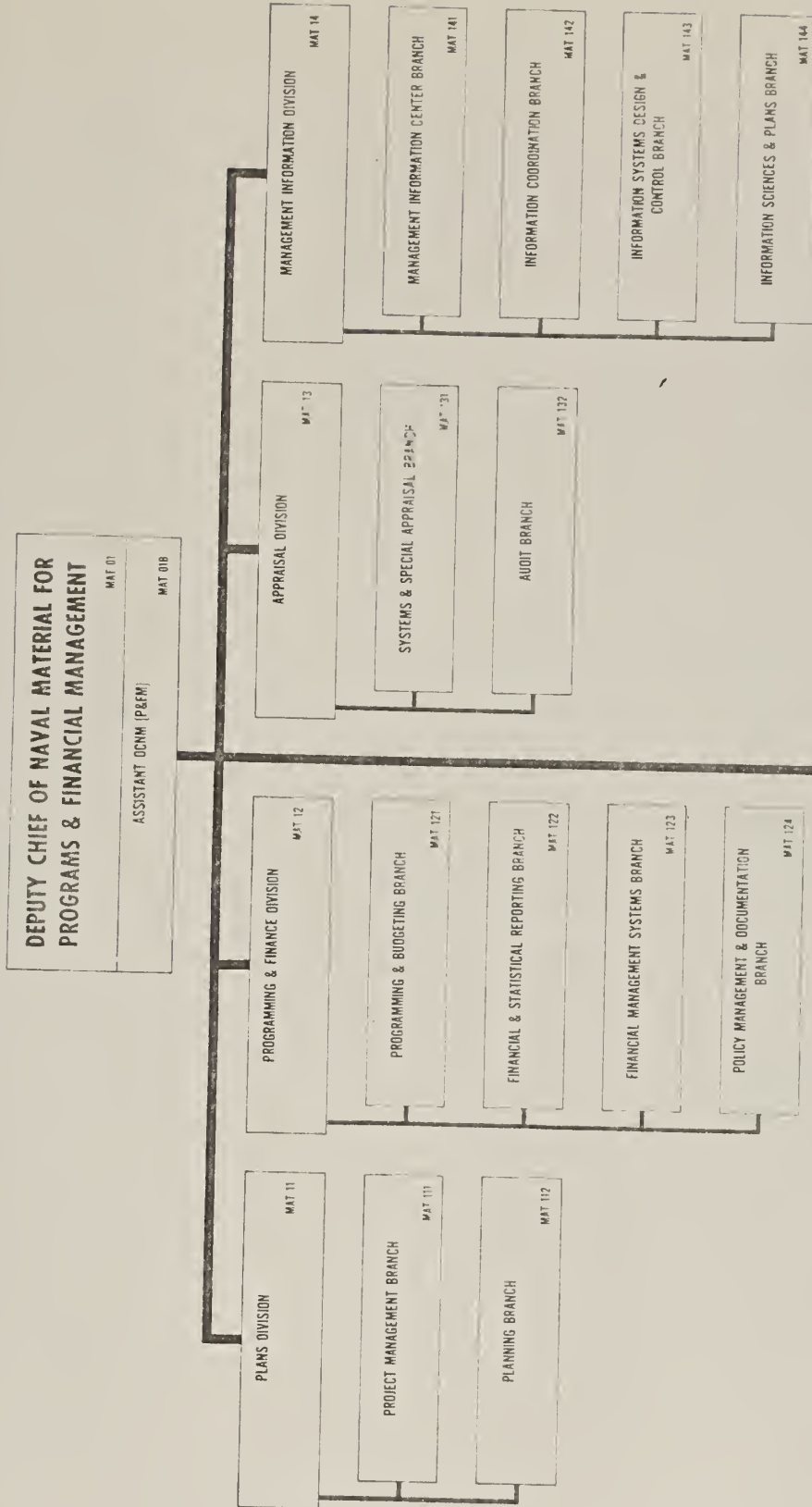
The Data Systems Information Systems Division, in collaboration with the Bureau Assistant Chiefs and Offices, is responsible for the development of a data systems master plan for the NWE; coordinating investigations of requests for new data systems, and recommending approval or disapproval of such requests; developing and promulgating standardized techniques, procedures, and controls to ensure an efficient disciplined ADP effort for the NWE.

.....
The Advance Techniques Branch (DSIS-2) is responsible for the constant surveillance of the ADP technology for new concepts, logic theories and operations research results, that could be applied to the Bureau's ADP procedures and processes for the efficient execution of customer ADP data systems requirements.

.....
The Workload Analysis and Control Branch (DSIS-3) is responsible for the management control and appraisal of Data Systems Workload; evaluation of data processing systems and services effectiveness and cost factors; and providing continuous analytical appraisal and improvement of data processing plans, programs and procedures.

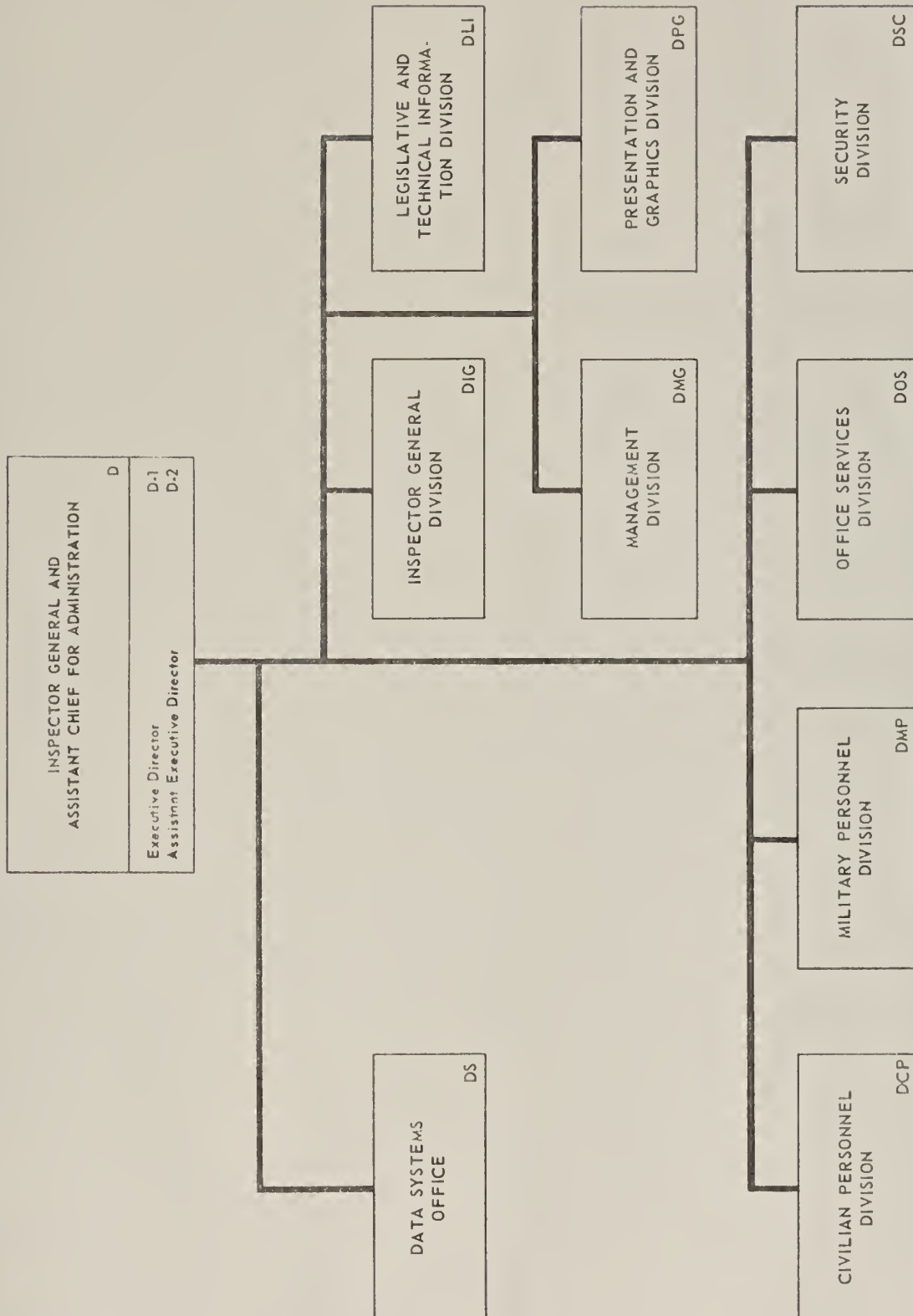
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¹U. S. Department of the Navy, Bureau of Naval Weapons, Bureau of Naval Weapons Organizational Manual, Inst. 5430.1A ch. 8, December, 1965, p. DS-3.



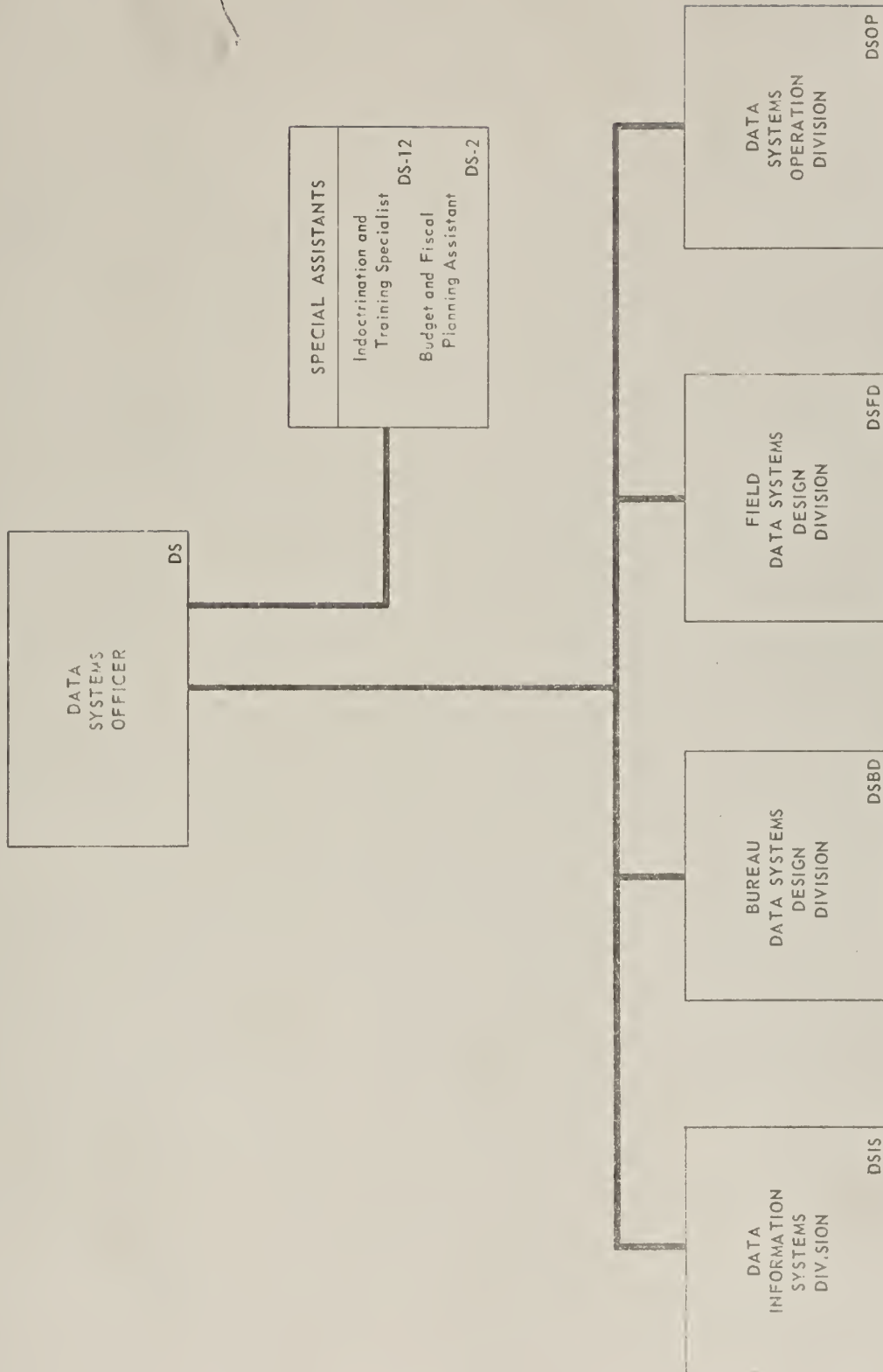
Source: Organization Manual, Office of Naval Material.

Exhibit 8



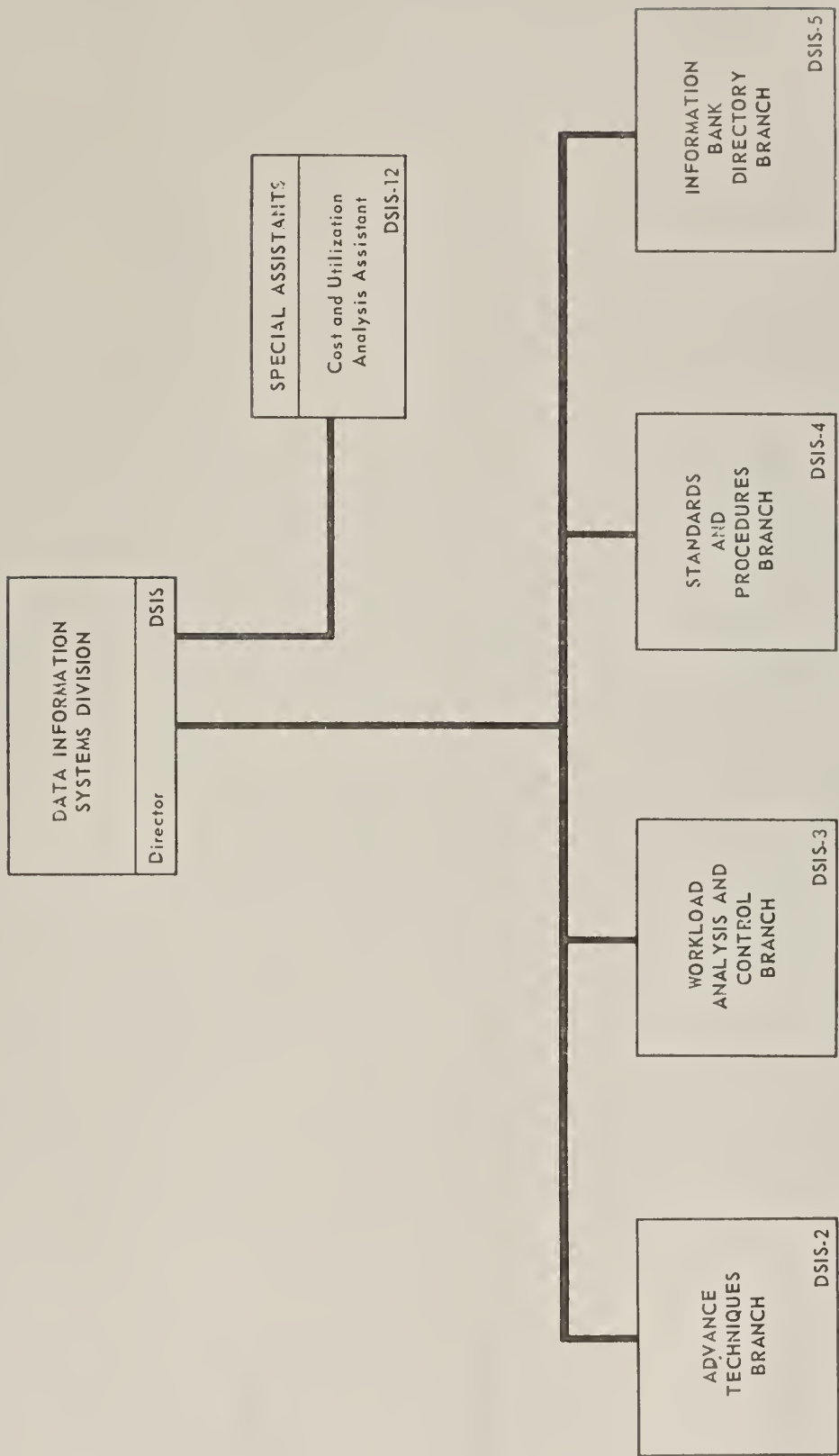
Source: Organization Manual, Bureau of Naval Weapons.

Exhibit 9



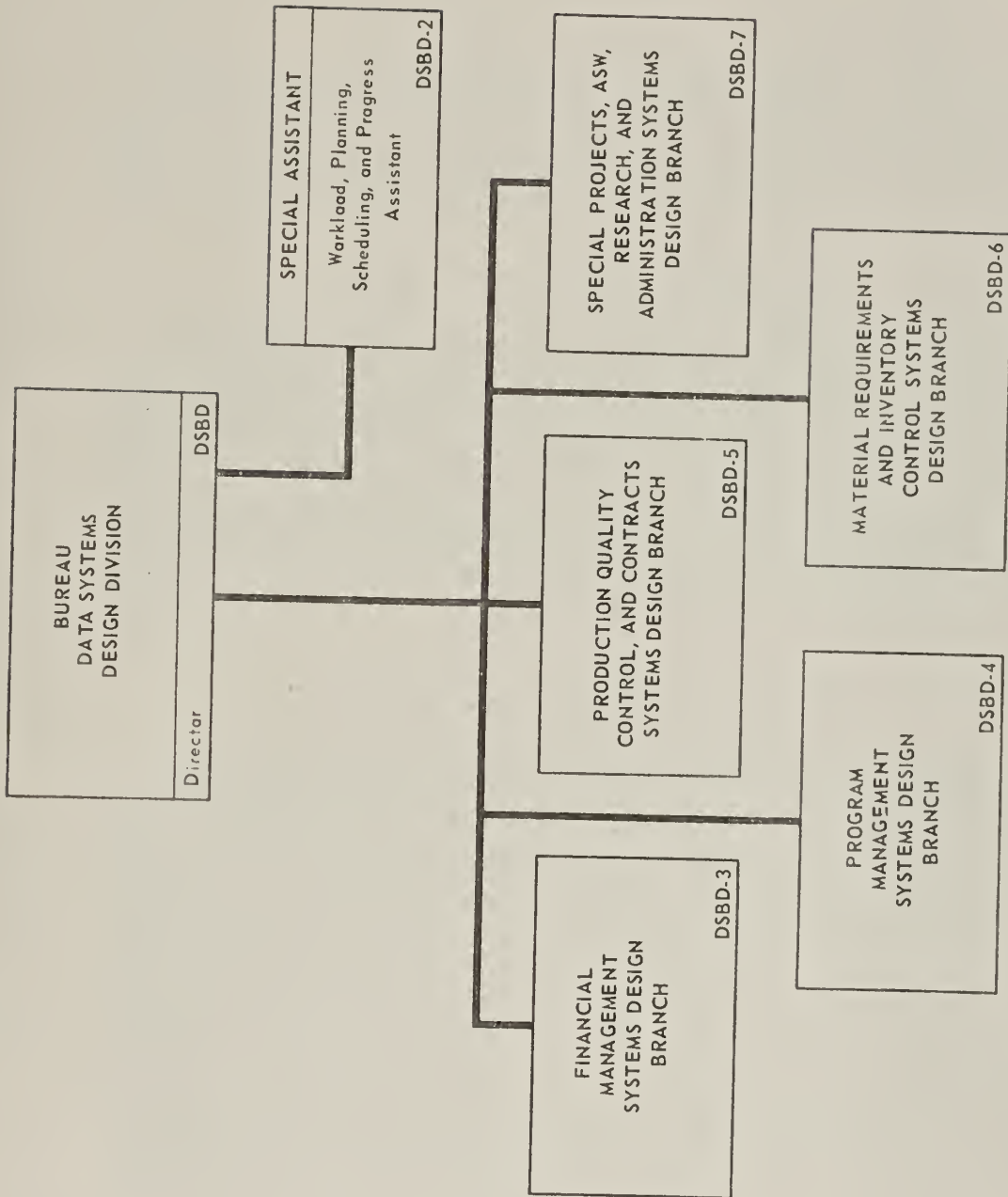
Source: Organization Manual, Bureau of Naval Weapons.

Exhibit 10



Source: Organization Manual, Bureau of Naval Weapons.

Exhibit 11



Source: Organization Manual, Bureau of Naval Weapons.

The Standards and Procedures Branch (DSIS-4) is responsible for developing, coordinating, establishing and promulgating standardized techniques and procedures to ensure an efficient, disciplined ADP effort for the Naval Weapons Establishment.

.....

The Information Bank Directory Branch (DSIS-5) is responsible for developing, establishing, administering and maintaining a program to standardize and control reporting of data elements to minimize duplication in data gathering and collecting.¹

(Refer to Exhibits 9 and 11)

The Bureau Data Systems Design Division (DSBD) is responsible for providing BUWEPs Assistant Chiefs with automated data processing applications. This requires overall responsibility for ADP systems planning, design, development, installation, administration, integration, review and improvement. Provides automated systems support and continual systems surveillance to the cognizant Assistant Chief's Office responsible for each Bureau functional subject matter.²

(Refer to Exhibits 9 and 12)

The Data Systems Operation Division is responsible for the end product of the total ADP program--the production of reports embodying the quality control concept in data manipulation to assist the customer in his decision-making responsibilities; collaborating with the Data Systems Officer in planning, developing, controlling, funding, and costing an automatic data processing equipment program for the BUWEPs; directing and evaluating its implementation; administering the data processing program for the Bureau including issuing instructions and procedures assuring optimum use of ADP equipment; planning and recommending actions relative to selection and acquisition of new and/or additional ADP equipment and related support materials; planning and providing

¹Ibid., DSIS-3-6.

²Ibid., DSBD-3.

The following information was obtained from the records of the Department of the Interior, Bureau of Land Management, regarding the land in question.

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The land in question is situated in the County of ... State of ... and is owned by ...

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computer programming and operation services for the Bureau, including supervision of programming services acquired from field activities and contractors; and, participating with the Data Information Systems Division in (1) the development and implementation of a data information system plan for the BUWEPs establishment, and (2) analyzing requests for new data information systems design and development, feasibility studies, and application plans.

.....

The Programming Branch (DSOP-2) is responsible for:

- a. Developing standards, policies, practices, and instructions relating to Bureau ADP programming.
- b. Planning and providing ADP programming services for approved automatic data processing systems.
- c. Supervising ADP programming services acquired from field ADP organizations.
- d. Serving as coordination and contact point for ADP programming services rendered to field activities, other Navy organization, and other federal agencies.

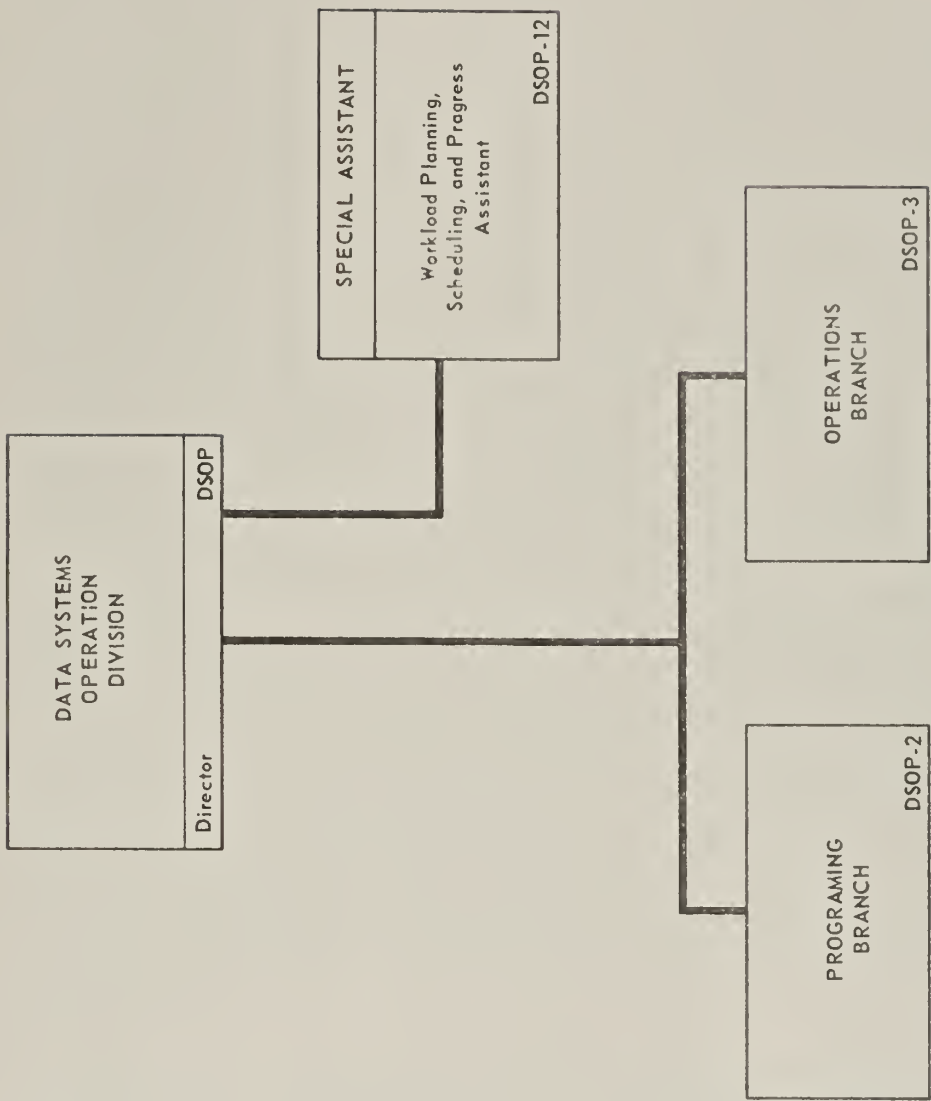
The Operations Branch (DSOP-3) is responsible for:

- a. Developing and establishing EAM/ADPE service requirements, standards, policies, practices, and instructions related to machine operations.
- b. Assuring proper atmospheric environment for EAM/ADP machine operation.
- c. Injecting discipline in utilization of machine tapes.
- d. Preparing and posting schedules of machine loading to mesh with requirements of Workload Planning, Scheduling, and Progress Assistant (DSOP-12).
- e. Providing machine operations service to customers.
- f. Sorting, assembling and providing for delivery of reports.
- g. Maintaining liaison with ADP equipment contractors for upkeep of equipment.¹

(Refer to Exhibits 9 and 13)

The Field Data Systems Design Division is responsible for providing assistance and support to field commands in the overall planning, developing, installing, coordinating, integrating, implementing,

¹Ibid., pp. DSOP-3-4.



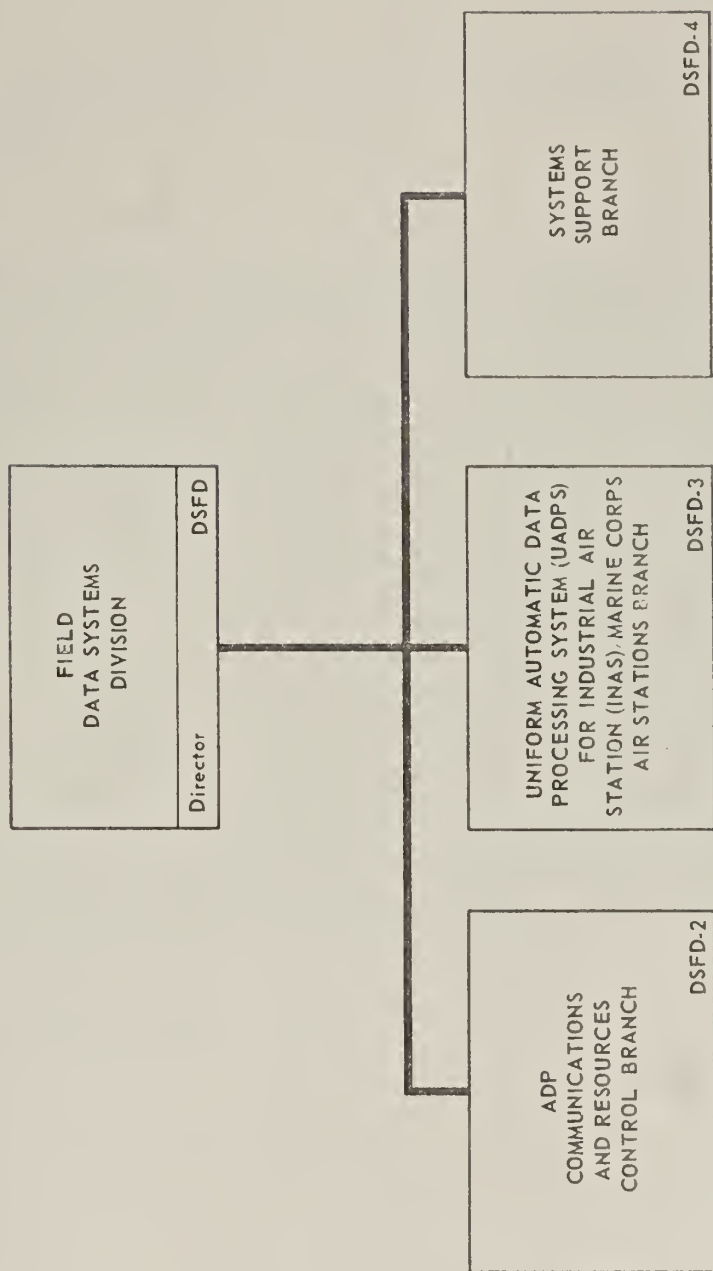
Source: Organization Manual, Bureau of Naval Weapons.

monitoring, reviewing, evaluating, and improving ADP systems and associated source data automated systems for BUWEPS field activities; providing automated systems support and continual systems surveillance to the cognizant commands and Fleet Readiness Representatives for their respective areas; planning, developing, installing, coordinating, integrating, implementing, reviewing, evaluating, and improving communication networks for BUWEPS field activities; and communication equipment resources; reviewing, analyzing, approving, and procuring ADP, SDA, and communication equipment for BUWEPS field activities; preparing purchase vs. rental justification and recommendations; reviewing, developing, and evaluating ADP feasibility studies, problem definitions and application studies; coordinating ADP and communication site preparation; directing the operational control of field ADP installations; providing assistance, guidance and coordination of systems design, analysis, programming and implementation of ADP systems delivered in the field; planning, scheduling, and coordinating system design, performing the analysis, programming, testing and coordinating the implementation of systems developed centrally for field activities, planning, obtaining and coordinating manufacturer support of ADP systems developed centrally and in the field; planning, coordinating and implementing the redistribution of purchase hardware; collecting and evaluating ADP, SDA, and communication equipment, and personnel utilization information, and direction of release, redistribution of augmentation as necessary; determining and implementing the security measures required at BUWEPS field activities; providing the coordination and participation in informal evaluations for reviews including Readiness Reviews and Post Installation Reviews; providing centralized technical ADP consultation services for field activities and on-site technical guidance for development and implementation of ADP systems in BUWEPS field activities.

The ADP Communications and Resources Control Branch (DSFD-2) is responsible for providing guidance, coordination, and assistance in the establishment of principles, policies, and practices for utilization and control of automatic data processing equipment (ADPE), source data automatic equipment and data communications, and ADP and data communications physical security requirements throughout the NWE. These responsibilities include:

. :

Exhibit 13



Source: Organization Manual, Bureau of Naval Weapons.

- f. Reviewing, analyzing, evaluating, approving, and installing all EAM/EDPM, communications and source data equipment acquisitions. Obtaining approval of higher authority, where required, for computer and communications installation.

.....

- o. Issuing instructions for the reutilization of surplus government and contractor ADP and SDA equipment.

.....

The Systems Support Branch (DSFD-4) is responsible for providing automated systems support and continual systems surveillance to BUWEPS field stations under the cognizant commands and Fleet Readiness Representatives in their respective functional matter areas; providing on-site technical assistance, guidance and coordination in system design, programming, and implementation of ADP systems developed in the field; providing a central ADP consulting service for ADP matters for BUWEPS field activities; planning, developing, installing, coordinating, integrating, implementing, monitoring, reviewing, evaluating and improving standard ADP systems developed in the BUWEPS field activities; developing, reviewing and evaluating feasibility studies, problem definitions and application studies of BUWEPS field activities; collecting and evaluating utilization information of ADP, SDA, and communication equipment and personnel, and recommending release, procurement of redistribution of resources; and for coordinating and participating in formal evaluations and reviews including Readiness Reviews and Post Installation Reviews.¹

Application and Scope.--The policies, procedures and requirements described in the following sections apply to all departmental operating executives. They apply to all information systems except the following: (1) command and control systems, (2) systems integral to a weapons system, (3) terminal communications systems and (4) scientific computational systems.

¹Ibid., pp. DSFD-3.

The Commission, established by the Government of the Republic of the Philippines, has the honor to inform you that it has received your letter of the 10th of March, 1954, regarding the matter mentioned therein.

.....

The Commission has taken note of the information furnished to it by the Bureau of Customs and has decided to refer the matter to the Bureau of Internal Revenue for its consideration.

.....

The Commission has also taken note of the fact that the Bureau of Customs has advised that the matter is being handled by the Bureau of Internal Revenue. The Commission has decided to wait for the results of the Bureau of Internal Revenue's action on the matter. The Commission has also decided to inform you of the results of its action on the matter as soon as it has been decided.

Very truly yours,

Commissioner of Customs and Excise
Bureau of Customs
Manila, Philippines

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They also apply to all electronic digital computers and peripheral equipment, including local data transmission facilities, and punched-card equipment. Computers that are integral to a weapons system or built with Research, Development, Test and Evaluation funds are specifically exempted.

Policies and Operating Procedures

System development procedures.--Exhibit 14 (page 78) is the MIDSP systems development and implementation flow chart. A Secretary of the Navy Instruction¹ outlines this portion of the program which is designed to coordinate systems development and to provide standard documentation procedures.

The Information System Plan (ISP), which is developed annually by the Departmental components, is a critique and a plan. It identifies the total information requirements of the component and shows how these requirements are being fulfilled by present systems. Information deficiencies are identified and a plan, including priorities and a time schedule to meet these deficiencies, is provided. The ISP time span is limited to the present year and the four succeeding years. The ISP issued by the Special Assistant Secretary of the Navy (SASN) is a compilation of the individual ISP's.

The first ISP's were submitted in March, 1966. Specific OMI-SASN guidance was not provided during this first effort. These first ISP's are an inventory of present systems resources,

¹U. S. Department of the Navy, Office of the Secretary, Management Information and Data Systems; Plans and Procedures For, Inst. 5200.14, November 3, 1965.

a survey of the problems to be solved and will be the basis for future OMI-SASN guidance. In the future, the SASN will provide the external (e.g. DOD) requirements in his guidance document.

The Departmental components will conduct feasibility studies based on the approved ISP. The System Design Proposal (SDP) is the result of this study. The SDP states the specific information deficiencies the proposed system will satisfy and provides a cost-benefit analysis of the proposed system with respect to the present system. The SDP also specifies the probable resource requirements including equipment, personnel, facilities and communications. A "milestone schedule" is also required. The SDP is not required for systems completely internal to a Departmental component.

OMI reviews the SDP; provides the necessary coordination with other Departmental components and recommends action in the form of Approved System Requirements (ASR). The ASR specifies: (1) the objectives to be met, (2) the organization primarily responsible for the system design, (3) other participating organizations, (4) the specific design criteria and parameters, (5) the progress reports required, and (6) the documentation criteria for the System Description and Implementation Plan (SD/IP) and the Pre-Installation System Evaluation (FPSE).

The SD/IP is the "output" of an intensive systems study by the Departmental components. The SD/IP contains an analysis of the present system and states the improvements expected from

the new system. It specifies: (1) the source of all input data, (2) the purpose of each element of output, (3) data processing equipment requirements, including the proposed source, e.g. present installation, sharing, re-utilization of excess Government equipment or new acquisitions, (4) the cost benefit comparison between the new system and the present system, (5) the implementation schedule and (6) the system specifications.

Systems Implementation.--The Systems specifications are an output of the systems design phase, and serve as the connecting link between systems design and equipment selection and acquisition, in the case of an automated system. A Secretary of the Navy Instruction¹ requires that system specifications be developed independently of any manufacturer's hardware-software package and that equipment selection be based on an approved set of systems specifications. Identical system specifications are furnished to each supplier with the requests for quotations. The content requirements for system specifications are shown in Appendix D.

The responsible Departmental component evaluates the suppliers' Equipment Proposals and selects the equipment. The primary selection criteria are the capability of the equipment to meet the system specifications and the total costs (acquisition and operation). This selection is subject to OMI review and SASN approval with the following exceptions: (1) changes

¹U. S. Department of the Navy, Office of the Secretary, Inst. PL0462.7A ch. 3, p. iv-1.

in existing punched-card "unit record" equipment, (2) charges in the peripheral gear of existing computer or punched-card installations, which do not require re-programming, and do not exceed the total cost of the prime shift central processing unit rental cost by 15 per cent or \$24,000 whichever is less, and (3) changes in data transmission facilities which do not exceed the originally approved cost by more than 10 per cent.¹

The method of acquisition, i.e. purchase, lease, or lease with the option to purchase is also determined by the Departmental component. The criteria suggested in Bureau of the Budget Circular A-54 are used. Each component of a system is analyzed separately.² The general policy is that: "The method of acquiring ADPE will be that which offers the greatest advantage to the Department of the Navy under the circumstance pertaining to each situation."³ In October, 1965, the Navy had 380 computers. 206 (54 per cent) were owned; 174 (46 per cent) were leased.⁴ Federal Supply Schedules must be used if they are available. There are no provisions for inter-Departmental component pooling of requests for quotations.

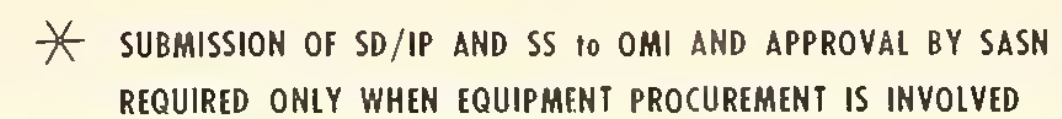
¹Ibid., p. v-3.

²Interview with J. R. Doherty, Field Data Systems Division, Bureau of Naval Weapons, Department of the Navy, April, 1966.

³U. S. Department of the Navy, Office of the Secretary, Inst. P10462.7A ch. 3, p. iv-2.

⁴Interview with Hunter M. Jones, Jr., Head, Systems Evaluation and Installation Management Branch, Systems Automation Division, Office of Management Information, Department of the Navy, March, 1966.

(EXC. SCIENTIFIC, COMMAND & INTELLIGENCE SYSTEMS)



Comprehensive documentation to justify the selection and acquisition decisions must be forwarded to the SASN through OMI with the request for approval. This documentation must include the time and cost data associated with each equipment component and a list of equipments eliminated because they could not meet the time requirements of the Systems Specifications or would not be available by the proposed installation date. The specific selection criteria must be shown when no single Equipment Proposal is superior in all categories. The approval request must certify that all alternate sources of equipment, i.e. sharing and re-utilization, have been investigated and found deficient. The cost analysis and assumptions used in the method of acquisition decision must also be provided.

The Final Pre-installation System Evaluation (FPSE) is conducted thirty to sixty days prior to the scheduled equipment installation date. The FPSE is conducted by OMI for all business-logistic computer information systems. The FPSE is conducted to insure that the installation can effectively use the equipment immediately after installation. The Documentation required by the ASR is reviewed and the provision for conversion from the present system to the new system and the detailed operating procedures of the new system are evaluated. The adequacy of the record and reporting system and the methods to be used to document the benefits of the new system are also appraised. OMI is developing an outline of the evaluation

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procedures and criteria to aid the OMI and Departmental component inspectors.¹

The Navy Automatic Data Processing Management Information System (NADPMIS).--NADPMIS was designed to meet the Government wide reporting system requirements of the Bureau of the Budget Circular A-55. There are, however, several significant features in NADPMIS that provide additional and more timely management information to OMI. These include:

1. Semi-annual inventory reporting and quarterly utilization reporting,
2. Computer installation costs reported as: (a) salary, (b) equipment rental cost, (c) equipment purchase cost, (d) other costs,
3. Personnel costs reported by functions: (a) equipment operations, (b) systems analysis, (c) programming, and (d) in-house maintenance,
4. An annual cost report for each computer that shows: (a) prime-shift rental charges, (b) extra-rental charges, (c) the (hypothetical) purchase price of equipment being rented, (d) the maintenance costs of rented equipment if it were purchased, (e) the cost of owned equipment, and (f) the contract maintenance costs of owned equipment,
5. Computer applications and programming language reported quarterly for each computer.

NADPMIS is OMI's basic source of information to appraise the operating efficiency of the program. NADPMIS was initiated

provision and subject to the provisions of the
Constitution.

THE STATE OF TEXAS, COUNTY OF DALLAS, CITY OF DALLAS.

I, the undersigned, being a duly qualified
Notary Public in and for the State of Texas,
do hereby certify that the within and foregoing
instrument, to-wit: a certain deed, bearing date
the 1st day of January, 1900, and containing
the names and signatures of the parties thereto,
has been duly acknowledged before me by the
parties thereto.

IN WITNESS WHEREOF, I have hereunto set my hand and

the seal of my office, at Dallas, Texas, this
1st day of January, 1900.

(S) Notary Public in and for the State of Texas,
My Commission Expires the 1st day of January, 1901.

I, the undersigned, being a duly qualified
Notary Public in and for the State of Texas,
do hereby certify that the within and foregoing
instrument, to-wit: a certain deed, bearing date
the 1st day of January, 1900, and containing
the names and signatures of the parties thereto,
has been duly acknowledged before me by the
parties thereto.

I, the undersigned, being a duly qualified
Notary Public in and for the State of Texas,
do hereby certify that the within and foregoing
instrument, to-wit: a certain deed, bearing date
the 1st day of January, 1900, and containing
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parties thereto.

in November 1965.¹

NADPMIS is being revised to comply with the quarterly ADP Plans Report requirement, initiated by the March 9, 1966 revision to Circular A-55.

Equipment re-utilization screening procedures.--Department of Defense Instruction 4160.19, Re-Utilization Screening of Automatic Data Processing Equipment, of August 12, 1964, adds two additional screening levels to the General Services Administration screening procedures. The instruction requires DOD components to conduct an in-house screening to find possible secondary users. If none are found within the DOD component the equipment is reported to the Defense Supply Agency (DSA) for DOD-wide screening. If no secondary users are found within DOD, DSA reports the equipment to the General Services Administration. All equipment (as defined under "Application and Scope" above) that is to be released by a DOD component is subject to the screening procedures. A minimum of 180 days is required after the equipment is reported to DSA.

The instruction also requires all DOD components to review the GSA listing of excess equipment prior to initiating requests for new acquisitions. Requests for new acquisition approval must certify that this procedure has been followed and that no excess equipment will be available to meet the requirements economically.

¹U. S. Department of the Navy, Office of the Secretary, Inst. PL0462.7A ch. 3, Appendix D.

OMI coordinates the Navy in-house screening program.

Automatic data processing resource sharing.--A Secretary of the Navy instruction¹ requires all Naval Activities to offer available equipment time and associated personal services for sharing. It likewise requires all activities to exhaust all proximate sources of sharing Government or Government-owned contractor operated facilities prior to requesting additional resources. The use of the General Services Administration Sharing Exchanges is encouraged but not required.

The instruction applies to all equipment, as described above under "Application and Scope," except that equipment, associated with military operational and security systems and small punched-card computers (monthly rental less than \$2500). Sharing arrangements may be either re-imbursable or non-re-imbursable and the prices are negotiated on an individual basis. In the quarter ending December 31, 1965, Navy computer installations provided 6904 hours of computer time to other activities.²

Standardization and compatibility.--Compatibility between systems, and between equipment, and a standard vocabulary are essential to an integrated information system. The most basic item is a standard data element and code structure.

Secretary of the Navy Instruction No. 10462.1, Data Elements and Data Codes Standardization Program, of May 1965, implemented the Department of Defense program within Navy. The

¹U. S. Department of the Navy, Office of the Secretary, Inst. P10462.7A ch. 3, Appendix E.

²Interview with Hunter M. Jones, Jr.

(a) Consider the two cases: (i) $\alpha = 0$, (ii) $\alpha > 0$.
In the first case, the function $f(x)$ is constant and equal to α .
In the second case, the function $f(x)$ is not constant and
is equal to α for all x such that $x \leq 0$. For $x > 0$,
the function $f(x)$ is equal to $\alpha + x$. This is because
for $x > 0$, the function $f(x)$ is equal to $\alpha + x$ and
for $x \leq 0$, the function $f(x)$ is equal to α .
The function $f(x)$ is continuous at $x = 0$ because
the limit of $f(x)$ as x approaches 0 from the left is α and
the limit of $f(x)$ as x approaches 0 from the right is α .
The function $f(x)$ is differentiable at $x = 0$ because
the limit of $\frac{f(x) - f(0)}{x - 0}$ as x approaches 0 from the left is 0 and
the limit of $\frac{f(x) - f(0)}{x - 0}$ as x approaches 0 from the right is 1 .
Therefore, the function $f(x)$ is not differentiable at $x = 0$.
The function $f(x)$ is differentiable at $x \neq 0$ because
the limit of $\frac{f(x) - f(x_0)}{x - x_0}$ as x approaches x_0 from the left is 1 and
the limit of $\frac{f(x) - f(x_0)}{x - x_0}$ as x approaches x_0 from the right is 1 .
Therefore, the function $f(x)$ is differentiable at $x \neq 0$ and
the derivative of $f(x)$ is 1 for $x \neq 0$.
The function $f(x)$ is not differentiable at $x = 0$ and
the derivative of $f(x)$ does not exist at $x = 0$.
(b) Consider the function $f(x) = \begin{cases} x^2 \sin \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$.
The function $f(x)$ is continuous at $x = 0$ because
the limit of $f(x)$ as x approaches 0 is 0 .
The function $f(x)$ is differentiable at $x = 0$ because
the limit of $\frac{f(x) - f(0)}{x - 0}$ as x approaches 0 is 0 .
Therefore, the function $f(x)$ is differentiable at $x = 0$ and
the derivative of $f(x)$ is 0 at $x = 0$.
The function $f(x)$ is differentiable at $x \neq 0$ because
the limit of $\frac{f(x) - f(x_0)}{x - x_0}$ as x approaches x_0 is $2x_0 \sin \frac{1}{x_0} - \frac{1}{x_0}$.
Therefore, the function $f(x)$ is differentiable at $x \neq 0$ and
the derivative of $f(x)$ is $2x \sin \frac{1}{x} - \frac{1}{x}$ for $x \neq 0$.

1. The function $f(x)$ is continuous at $x = 0$ because
the limit of $f(x)$ as x approaches 0 is 0 .
2. The function $f(x)$ is differentiable at $x = 0$ because
the limit of $\frac{f(x) - f(0)}{x - 0}$ as x approaches 0 is 0 .
3. The function $f(x)$ is differentiable at $x \neq 0$ because
the limit of $\frac{f(x) - f(x_0)}{x - x_0}$ as x approaches x_0 is $2x_0 \sin \frac{1}{x_0} - \frac{1}{x_0}$.

Systems Development Division of OMI is the Navy coordinating activity and the single point of contact with the Department of Defense. The Departmental components are to be assigned operational responsibility for developing standard data elements and codes in their particular functional area. Progress has been extremely slow due to the lack of manpower both at the OMI and Departmental component levels.¹ There is no Navy-wide standard data elements and codes publication. There are a very limited number of standard data elements and codes within the various Bureaus. A series of cross indexes must be used to convert from one system to another.²

The general policy with respect to equipment compatibility is that:

If there is a requirement for compatibility between two or more elements of the Department of the Navy, it is more appropriate and inducive to progress than earlier installations (however sound the selection when made) act to become compatible with latest best selections, or with properly established and approved standards, as appropriate.³

All equipment selected for business applications must have COBOL compilers available unless specifically exempted by the SASN.

Regulation of cost-type Government contractors.---Cost type Government contractors are included in only three elements

¹Interview with Edward Tolliver, Systems Development Division, Office of Management Information, Department of the Navy, February, 1966.

²Interview with J. R. Doherty.

³U. S. Department of the Navy, Office of the Secretary, Inst. P10462.7A ch. 3., p. iv-2.

of the Navy Management Information and Data System Program; the reporting system, the re-utilization screening process and the resource sharing procedures.

Government cost-type contractors that directly apply the total cost of an automatic data processing installation to a contract, operate Government-owned equipment, or operate equipment installed at a Government-owned installation must report automatic data processing equipment inventory and utilization data annually. Annual cost reports covering the past year, the present year and the following year are also required.

The re-utilization screening procedures apply to the same contractors that are required to report. They must report excess equipment and equipment that is to be replaced to OMI. They likewise must consider excess Government equipment as the first source of new equipment.

The sharing procedures apply only to Government-owned contractor operated (GOCO) equipment. The sharing arrangements apply between Government activities and GOCO's, between GOCO's and within a GOCO that operates two or more installations.

Future policies and operating procedures.--Automatic data processing is a relatively new and very dynamic endeavor. As a result, policy and procedural changes are common. The effective dates of the more recent changes have been indicated in the preceding discussion. A new edition of the Secretary of the Navy Instruction No. 10462.7 ch. 3 was approved in March 1966 and will be published in May. Other changes can be expected as the efforts, discussed in Chapter II, produce policy changes.

CHAPTER IV

AUTOMATIC DATA PROCESSING MANAGEMENT

1966 AND BEYOND

Factors Contributing to the Change

Spontaneous growth to a significant size.--In twenty years automatic data processing in the Federal Government has progressed from a negligible mechanical data processing operation to a three billion dollar per year system of electronic computers. This explosive growth has carried automatic data processing into every major function of the Federal Government.

The growth and development has not been orderly. Systems were designed before they were adequately conceived; programmed before they were adequately designed; and operated before they were adequately programmed. Today's automatic data processing resources are the result of a spontaneous multiplication of unrelated systems and installations in all parts of Government. The computer became a status symbol. It was regarded as a mysterious machine--capable of doing most anything, including its own management.

Defining the problem areas.--It soon became evident to elements within the Executive and Legislative Branches that, although the computer was particularly well suited to the complex and voluminous data processing needs of the Government,

it was also extremely expensive. It not only consumed about three per cent of the annual appropriations but it required large numbers of highly trained personnel. These personnel became increasingly scarce during the first half of the 1960's as the private sector's computer operations also multiplied. More efficient use of Government automatic data processing resources was not only desirable; it was a necessity!

The task was formidable. Very little information was available outside the individual installations and agencies to indicate the kinds of equipment being used, for what purposes it was being used, the costs incurred, the systems design and programming work that was going on, the difficulties encountered, and the benefits that were being realized. The extremely rapid technological advances were making installations obsolete before they could get into operation. The discipline was so different from any other that a whole new system of standards would have to be developed to appraise the operating efficiency. The operating agencies viewed automatic data processing as an intra-agency program, and resisted the attempts to promote efficiency and economy on an inter-agency basis.

The General Accounting Office prepared one of the first Government-wide automatic data processing evaluation reports, including an inventory of resources, in 1958. This report was followed by other Government-wide evaluations in 1960, 1963, 1964 and 1965. In addition, the General Accounting Office has

prepared about 100 audit reports identifying specific shortcomings.

The House Committees on Post Office and Civil Service and Government Operations conducted Hearings to determine the impact of automatic data processing in their areas of interest. Initial Congressional interest centered on the impact that automatic data processing would have on Government personnel. Congress later directed its efforts to the efficient management of all automatic data processing resources.

The Bureau of the Budget has conducted two comprehensive Government-wide automatic data processing surveys. The reports resulting from these surveys were published in 1959 and 1965. The Bureau of the Budget has also promoted the efforts of the Interagency Committee on Automatic Data Processing.

The emerging problems.---These Government-wide surveys identified a wide range of automatic data processing management deficiencies. The following are six of the more important problems:

1. There was no Government-wide automatic data processing management information system.
2. There were no procedures for the exchange of data processing information within and between the operating agencies. This resulted in much duplication of effort.
3. The acquisition procedures were inefficient.
4. There was a high degree of incompatibility between systems. This made it very difficult to share automatic data

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processing resources and complicated the problem of providing back-up facilities if required.

5. There were no accepted criteria for appraising operating efficiency.

6. Low utilization of many automatic data processing installations resulted in excessive equipment inventories and costs to the Government.

Government-wide attempts to solve the management problems.

The Bureau of the Budget, following its 1958-1959 study began to develop Government-wide policy guidelines for automatic data processing management. These were promulgated in a series of Bulletins and Circulars covering system analysis and design, equipment selection and acquisition, agency automatic data processing organization and operating procedures, automatic data processing resource sharing within and between agencies, and the assignment of Government-wide automatic data processing management responsibilities to the General Services Administration, the National Bureau of Standards and the Civil Service Commission. A Government-wide automatic data processing management information system was also established. The second Bureau of the Budget study in 1964 indicated that most of the problems identified by the earlier report, the General Accounting Office reports and the Congressional Hearings, were still very prevalent.

Shortly after the 1965 Bureau of the Budget report was published, Public Law 89-306 was enacted. This legislation

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formally approved the assignment of responsibilities, which the Bureau of the Budget had made earlier in the year, and established a revolving fund under General Services Administration control, to provide centralized acquisition of all Government automatic data processing equipment. This formal Congressional approval will enable the General Services Administration and the National Bureau of Standards to organize the staff support required to carry out their responsibilities.

Public Law 89-306 maintained the traditional overall policy responsibility in the Bureau of the Budget. Thus, with the additional staff resources and Congressional support provided by the legislation, the Bureau of the Budget should be able to develop and implement a Government-wide policy that will meet the automatic data processing management problems.

The Impact on the Department of the Navy--Conclusions

Government-wide policies and standards can be effectively administered under the Navy Management Information and Data Systems Program.--The Navy MIDSP provides a Department-wide Information System Plan which relates each system to the overall information system requirements of the Department. Priorities in system design can be established through the Approved Systems Requirement Document. Coordination and cooperation between the interested Departmental components are established by the same means. The Information System Plan and the Approved Systems Requirement set forth the objectives of the information systems

effort and assign the responsibilities for reaching these objectives. This increases the flow of information and reduces the duplication of effort between the various Departmental components.

The equipment acquisition procedures in the Department of the Navy meet the present Federal Standards but provisions for more centralized acquisition procedures must be made.--The use of standard Systems Specifications, developed independently of any particular equipment package and furnished to all qualified vendors, insures equal opportunity to all suppliers. The requirements that must be met in the justification accompanying the request for approval of equipment selection promotes maximum use of sharing arrangements and excess equipment available within the Government. Participation in the Sharing Exchange program, however, should be mandatory. The initial buy vs. lease decision criteria are identical to the published Federal guidelines, and an annual review of these decisions is provided for by the additional information contained in the Navy Automatic Data Processing Management Information System.

Public Law 89-306 makes it clear that the Congress wants the Government to exploit its position as the largest user of automatic data processing equipment. The cost factor used in equipment selection decisions might be significantly lowered by pooling requests for equipment proposals on a Government-wide basis. The departmental components would select a number of Equipment Proposals that meet their System Specifications. The

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final selection and acquisition would be from that vendor offering the greatest average cost advantage on all equipment under consideration.

The Department of the Navy will have to accelerate its Data Elements and Data Codes Standardization Program.--The use of a common vocabulary is a basic requirement for integrated systems development. A system that meets Navy requirements must be developed so that the Department of the Navy interests can be adequately considered by organizations responsible for developing Government-wide standards. In addition, an orderly procedure must be established to implement a standard system as it is developed.

Recommendations Concerning Further Studies

The Government-wide automatic data processing management effort. Concentrated staff work on the recommendations contained in The Report to the President and the provisions of Public Law 89-306 was just beginning as this paper was being prepared. It will be some time before this initial staff work produces any real policy decisions. A study similar to this, conducted during 1967, should provide an indication of the actual direction and progress of the Government-wide effort.

The Department of the Navy Management Information and Data System Program.--The Navy MIDSP is a new program up to the point of equipment selection. The first Information System Plan is now being reviewed. The results of this total program

approach to improve automatic data processing management in the Department of the Navy and to implement Government-wide policies would be an excellent area of study during 1968.

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APPENDIX A

FEDERAL GOVERNMENT AUTOMATIC DATA

PROCESSING APPLICATIONS¹

MATERIAL MANAGEMENT

Supply control at stocking points (depots and retail activities): Cataloging, requirements, stock levels, stock records, physical inventory.

Supply control at national control points: Cataloging, requirements, stock levels, stock records, surplus/disposal.

Procurement: Initiation actions, bid evaluation and review, purchase order and contract controls, due-in status control.

Maintenance of material: Standards, scheduling, requirements, bill of materials, work-in-progress control, quality control.

Overhaul and repair of materials: Standards, scheduling requirements, bill of materials, work-in-progress control, quality control.

FACILITIES MANAGEMENT

Property accounting for land, structures, equipment, machinery: Inventory records, reports, statistics.

Maintenance of property: Standards, scheduling, requirements, bill of materials, work-in-progress control, quality control.

Overhaul and repair of property: Standards, scheduling, requirements, bill of materials, work-in-progress control, quality control.

Construction: Standards, scheduling, requirements, progress control.

FINANCIAL MANAGEMENT

Budget estimates: Computations, preparation of schedules.

Budget administration: Allocations, allotments, financial plans.

Financial accounting: Appropriations expenditures, costs, financial statements.

Civilian payroll: Pay computations, registers, reports, leave.

Military payroll: Pay computations, registers, reports, leave.

¹U. S. Bureau of the Budget, The Inventory of Automatic Data Processing Equipment in the Federal Government, June, 1965, pp. 363-364.

1. INTRODUCTION

The following information is for your information only.

It is not intended to be used as a basis for action.

Very truly yours,

Enclosed for you are two copies of the report of the committee on the subject of the proposed amendment to the constitution of the United States, which was adopted by the House of Representatives on June 13, 1913.

The report is in two parts. The first part contains a statement of the facts and the second part contains the recommendations of the committee.

The committee has the honor to acknowledge the receipt of your letter of the 10th inst. and in reply to inform you that the report of the committee on the subject of the proposed amendment to the constitution of the United States, which was adopted by the House of Representatives on June 13, 1913, is now being prepared.

The report will be ready for distribution in a few days.

Very truly yours,

Enclosed for you are two copies of the report of the committee on the subject of the proposed amendment to the constitution of the United States, which was adopted by the House of Representatives on June 13, 1913.

The report is in two parts. The first part contains a statement of the facts and the second part contains the recommendations of the committee.

The committee has the honor to acknowledge the receipt of your letter of the 10th inst. and in reply to inform you that the report of the committee on the subject of the proposed amendment to the constitution of the United States, which was adopted by the House of Representatives on June 13, 1913, is now being prepared.

Retired civilian payroll: Computations, registers, reports.

Retired military payroll: Computations, registers, reports.

Military allotments: Administration of allotments made by military personnel.

Negotiable instruments accounting; checks, savings bonds, postal money orders.

Disbursing.

PERSONNEL MANAGEMENT

Integrated personnel system: Civilian, officer, enlisted, or Reserve personnel combined with pay, manpower, budgeting, etc.

Manpower: Requirements, allocations, utilization, research, planning.

Statistical reporting/strength accounting (civilian, officer, enlisted, or Reserve personnel): Strength, grades, minority groups, geographic location, veterans' status, accessions, separations, promotions, transfers.

Initial placement (civilian, officer, enlisted, or Reserve personnel): Recruiting, testing, test development, file of applicants, register of eligibles, certification.

In-service placement (civilian, officer, enlisted, or Reserve personnel): Assignment, promotion, skills inventory, individual training records, retention registers, RIF.

Career development (civilian, officer, enlisted, or Reserve personnel): Training requirements, planning, scheduling, records, statistics.

Position classification/wage administration (civilian, officer, enlisted, or Reserve personnel): Comparison of job requirements with classification standards.

Service control file: Central civilian personnel control of positions, employees, and personnel actions through automation of SF 7 data.

Automatic notification of required actions (civilian, officer, enlisted, or Reserve personnel): Periodic step (pay) increases, followups, length of service awards, mandatory retirement.

Employee-management relations/personnel services (civilian, officer, enlisted, or Reserve personnel): Medical, health, safety, industrial relations, conduct, discipline, grievances, appeals, awards, suggestions.

Educational institutions: Application processing, registration, class scheduling and assignment, testing, records, statistics.

NATURAL RESOURCES MANAGEMENT

Timber: Acreage controls, cutting, reforestation, records, statistics.

Minerals: Reserves, depletion, records, statistics.
Water: Flood control, pollution, power, development, records, statistics.
Land: Conservation, records, statistics.
Wildlife: Restocking, records, statistics.
Parks and forests: Maintenance, recreation, records, statistics.

OPERATIONS

Benefits administration (social security, Veterans' Administration, railroad retirement, unemployment compensation): Eligibility determination, beneficiary files, operating records, reports.

Tax administration: Revenue accounting, taxpayer files, operating records, reports.

Insurance: Premium accounting, dividend determinations, operating records, reports.

Loans and mortgages: Operating records, reports.

Grants: Operating records, reports.

National statistics: Periodic censuses and current statistics (social, labor, industry, agriculture, domestic trade, foreign trade, transportation, construction.

Intelligence.

Regulatory: License processing, facility allocations, rate determinations.

Weather data/forecasting.

National driver register.

Hospital and medical: Hospital administration, patient records.

Transportation (land, air, water): Traffic control, routing, cargo assignment, operating records, reports.

Commodity stabilization.

Grain price support.

Mobilization: Planning, damage assessment.

OPERATIONS CONTROL AND SUPPORT

Planning and evaluation techniques: PERT, PERT/cost.

Production control: Requirements, standards, scheduling, work-in-progress control, quality control.

Information storage and retrieval: Document control search, display.

ADP utilization: Scheduling, time accounting, costing.

SCIENTIFIC AND ENGINEERING

Design and engineering.

Simulation.

Performance analysis.

Numerical analysis

Tracking.

Trajectory computation.

Process control.

Surveying.

CLASSIFIED

COMPUTER CLASSIFICATION CHART

Environment Category Response Class	I Professional Support					II Central Computing Services		III Integrated Operations		IV Real Time Operations		V Research and Development		VI Special Operations	
	Remote console time shared systems					Engineering & Scientific Data Processing Digital Simulation		High Response Inventory Control Information Retrieval		Command & Control Communications Network Control Airline Reservations		Time Sharing Computations Engineering Design Modification & Interfacing for Communications Display Control Data Reduction Increased processing capacity & capability		Including Military Systems Involving Guidance computers range finding Computations & other Single Purpose Applications designed to operate under special conditions	
A. Priority	Remote console time shared systems					Engineering & Scientific Data Processing Digital Simulation		High Response Inventory Control Information Retrieval		Command & Control Communications Network Control Airline Reservations		Time Sharing Computations Engineering Design Modification & Interfacing for Communications Display Control Data Reduction Increased processing capacity & capability		Including Military Systems Involving Guidance computers range finding Computations & other Single Purpose Applications designed to operate under special conditions	
B. Time Critical	Experimental & Development Projects					Engineering & Scientific Data Processing Digital Simulation		Off-line Inventory Control & Information Retrieval Weather Predictions		Dynamic Simulation Missile Checkout		Communications		Computations & other Single Purpose Applications designed to operate under special conditions	
C. Scheduled	Engineering & Design Computations					Data Production Scientific Computations Business & Management Data Processing		Management & Business Systems		Bang-Safety Process Control		Increased processing capacity & capability		Computations & other Single Purpose Applications designed to operate under special conditions	

Source: U. S. Senate, Committee on Government Operations, Report to the President on the Management of Automatic Data Processing in the Federal Government, Document No. 15, 89th Cong. 1st Sess.

APPENDIX B

Public Law 89-306
89th Congress, H. R. 4845
October 30, 1965

AN ACT

To provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That title I of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, is hereby amended by adding a new section to read as follows:

"AUTOMATIC DATA PROCESSING EQUIPMENT

"Sec. III. (a) The Administrator is authorized and directed to coordinate and provide for the economic and efficient purchase, lease, and maintenance of automatic data processing equipment by Federal agencies.

"(b) (1) Automatic data processing equipment suitable for efficient and effective use by Federal agencies shall be provided by the Administrator through purchase, lease, transfer of equipment from other Federal agencies, or otherwise, and the Administrator is authorized and directed to provide by contract or otherwise for the maintenance and repair of such equipment. In carrying out his responsibilities under this section the Administrator is authorized to transfer automatic data processing equipment between Federal agencies, to provide for joint utilization of such equipment by two or more Federal agencies, and to establish and operate equipment pools and data processing centers for the use of two or more such agencies when necessary for its most efficient and effective utilization.

"(2) The Administrator may delegate to one or more Federal agencies authority to operate automatic data processing equipment pools and automatic data processing centers, and to lease,

purchase, or maintain individual automatic data processing systems or specific units of equipment, including such equipment used in automatic data processing pools and automatic data processing centers, when such action is determined by the Administrator to be necessary for the economy and efficiency of operations, or when such action is essential to national defense or national security. The Administrator may delegate to one or more Federal agencies authority to lease, purchase, or maintain automatic data processing equipment to the extent to which he determines such action to be necessary and desirable to allow for the orderly implementation of a program for the utilization of such equipment.

"(c) There is hereby authorized to be established on the books of the Treasury an automatic data processing fund, which shall be available without fiscal year limitation for expenses, including personal services, other costs, and the procurement by lease, purchase, transfer, or otherwise of equipment, maintenance, and repair of such equipment by contract or otherwise, necessary for the efficient coordination, operation, utilization of such equipment by and for Federal agencies: Provided, That a report of equipment inventory, utilization, and acquisitions, together with an account of receipts, disbursements, and transfers to miscellaneous receipts, under this authorization shall be made annually in connection with the budget estimates to the Director of the Bureau of the Budget and to the Congress, and the inclusion in appropriate acts of provisions regulating the operation of the automatic data processing fund, or limiting the expenditures therefrom, is hereby authorized.

"(d) There are authorized to be appropriated to said fund such sums as may be required which, together with the value, as determined by the Administrator, of supplies and equipment from time to time transferred to the Administrator; shall constitute the capital of the fund: Provided, That said fund shall be credited with (1) advances and reimbursements from available appropriations and funds of any agency (including the General Services Administration), organization, or contractor utilizing such equipment and services rendered them, at rates determined by the Administrator to approximate the costs thereof met by the fund (including depreciation of equipment, provision for accrued leave, and for amortization of installation costs, but excluding, in the determination of rates prior to the fiscal year 1967, such direct operating expenses as may be directly appropriated for, which expenses may be charged to the fund and covered by advances or reimbursements from such direct appropriations) and (2) refunds or recoveries resulting from operations of the fund, including the net proceeds of disposal of excess or surplus personal property and receipts from carriers and others for loss of or damage to property: Provided further, That following the close

of each fiscal year any net income, after making provisions for prior year losses, if any, shall be transferred to the Treasury of the United States as miscellaneous receipts.

"(e) The proviso following paragraph (4) in section 201 (a) of this Act and the provisions of section 602 (d) of this Act shall have no application in the administration of this section. No other provision of this section shall be applicable in the administration of this section.

"(f) The Secretary of Commerce is authorized (1) to provide agencies, and the Administrator of General Services in the exercise of the authority delegated in this section, with scientific and technological advisory services relating to automatic data processing and related systems, and (2) to make appropriate recommendations to the President relating to the establishment of uniform Federal automatic data processing standards. The Secretary of Commerce is authorized to undertake the necessary research in the sciences and technologies of automatic data processing computer and related systems, as may be required under provisions of this subsection.

"(g) The authority conferred upon the Administrator and the Secretary of Commerce by this section shall be exercised subject to direction by the President and to fiscal and policy control exercised by the Bureau of the Budget. Authority so conferred upon the Administrator shall not be so construed as to impair or interfere with the determination by agencies of their individual automatic data processing equipment requirements, including the development of specifications for and the selection of the types and configurations of equipment needed. The Administrator shall not interfere with, or attempt to control in any way, the use made of automatic data processing equipment or components thereof by any agency. The Administrator shall provide adequate notice to all agencies and other users concerned with respect to each proposed determination specifically affecting them or the automatic data processing equipment or components used by them. In the absence of mutual agreement between the Administrator and the agency or user concerned, such proposed determinations shall be subject to review and decisions by the Bureau of the Budget unless the President otherwise directs."

APPENDIX C

CURRENT DATA STANDARDIZATION CATEGORIES

American Standards Association

CATEGORY	NAVY COORD.	DOD COORD.	FEDERAL COORD.
1. TEMPORAL (DATE & TIME)	CNO	OSD	
2. GEOGRAPHIC UNITS	CNO	OSD	
3. IDENTIFICATION OF ORGANIZATIONS & INDIVIDUALS		OSD	
4. TRANSPORTATION		OSD	
5. COMMUNICATIONS	CNO	OSD	

APPENDIX C

CURRENT DATA STANDARDIZATION CATEGORIES

CATEGORY	Federal		
	NAVY COORD.	DOD COORD.	FEDERAL COORD.
1. CIVILIAN PERSONNEL	OIR	OSD	CSC
2. COUNTRY CODIS AND SUBDIVISIONS	CNO	OSD	BOB
3. PLACE (POINT)	CNO	OSD	BOB
4. STATES & SUBDIVISIONS OF U.S.	CNO	OSD	BOB
5. GOVERNMENT AGENCIES	CNO	OSD	BOB
6. BUSINESSES	CNO	OSD	BOB
7. TIME PERIOD		OSD	BOB
8. INDIVIDUAL NAME AND NUMERICAL IDENT.		OSD	BOB

APPENDIX C

CURRENT DATA STANDARDIZATION CATEGORIES

Department of Defense

CATEGORY	Department of Defense		FEDERAL COORD.
	NAVY COORD.	DOD COORD.	
1. GEOPOLITICAL	COMPT	DIA	
2. DEFENSE ORGANIZATION INITIATIVES (DOES)	CNO	OSD	
3. CONTRACT ADMINISTRATION (MILSCAP)	CNM	DSA	
4. MILITARY PAY (JUMPS)	COMPT	AF	
5. ITEM CHARACTERISTICS (MILSTICCS)	CNM	DSA	
6. ITEM MANAGEMENT CHARACTERISTICS (MILSIMDS, etc)	CNM	DSA	
7. CIVILIAN PROCUREMENT CAREER DEVELOPMENT	OIR	DSA	
8. INTELLIGENCE DATA	CNO	DIA	
9. COMMUNICATIONS SYSTEMS	CNO	DCA	
10. COMMAND SYSTEMS (NMCS)	CNO	JCS	
11. R&D THESAURUS	ONR	NAVY	
12. INDEX OF INVESTIGATIONS	CNO	ARMY	

No.	Name of Institution	City	State	Year	Amount	Remarks
1	University of California	Berkeley	Calif.	1900	1000	
2	Stanford University	Stanford	Calif.	1901	500	
3	Harvard University	Cambridge	Mass.	1902	200	
4	Yale University	New Haven	Conn.	1903	150	
5	Columbia University	New York	N.Y.	1904	100	
6	University of Michigan	Ann Arbor	Mich.	1905	80	
7	University of Wisconsin	Madison	Wis.	1906	70	
8	University of Illinois	Urbana	Ill.	1907	60	
9	University of Texas	Austin	Texas	1908	50	
10	University of Georgia	Athens	Georgia	1909	40	
11	University of Florida	Gainesville	Florida	1910	30	
12	University of Alabama	Tuscaloosa	Alabama	1911	20	
13	University of South Carolina	Columbia	South Carolina	1912	15	
14	University of North Carolina	Chapel Hill	North Carolina	1913	10	
15	University of Virginia	Charlottesville	Virginia	1914	8	
16	University of Kentucky	Lexington	Kentucky	1915	5	
17	University of Tennessee	Knoxville	Tennessee	1916	3	
18	University of Mississippi	Oxford	Mississippi	1917	2	
19	University of Louisiana	Baton Rouge	Louisiana	1918	1	
20	University of Arkansas	Fayetteville	Arkansas	1919	1	
21	University of Missouri	Columbia	Missouri	1920	1	
22	University of Iowa	Iowa City	Iowa	1921	1	
23	University of Nebraska	Lincoln	Nebraska	1922	1	
24	University of Kansas	Lawrence	Kansas	1923	1	
25	University of Oklahoma	Norman	Oklahoma	1924	1	
26	University of Colorado	Boulder	Colorado	1925	1	
27	University of Arizona	Tucson	Arizona	1926	1	
28	University of New Mexico	Albuquerque	New Mexico	1927	1	
29	University of Idaho	Boise	Idaho	1928	1	
30	University of Montana	Helena	Montana	1929	1	
31	University of Wyoming	Laramie	Wyoming	1930	1	
32	University of Utah	Salt Lake City	Utah	1931	1	
33	University of Nevada	Reno	Nevada	1932	1	
34	University of Oregon	Eugene	Oregon	1933	1	
35	University of Washington	Seattle	Washington	1934	1	
36	University of California	Berkeley	Calif.	1935	1	
37	Stanford University	Stanford	Calif.	1936	1	
38	Harvard University	Cambridge	Mass.	1937	1	
39	Yale University	New Haven	Conn.	1938	1	
40	Columbia University	New York	N.Y.	1939	1	
41	University of Michigan	Ann Arbor	Mich.	1940	1	
42	University of Wisconsin	Madison	Wis.	1941	1	
43	University of Illinois	Urbana	Ill.	1942	1	
44	University of Texas	Austin	Texas	1943	1	
45	University of Georgia	Athens	Georgia	1944	1	
46	University of Florida	Gainesville	Florida	1945	1	
47	University of Alabama	Tuscaloosa	Alabama	1946	1	
48	University of South Carolina	Columbia	South Carolina	1947	1	
49	University of North Carolina	Chapel Hill	North Carolina	1948	1	
50	University of Virginia	Charlottesville	Virginia	1949	1	
51	University of Kentucky	Lexington	Kentucky	1950	1	
52	University of Tennessee	Knoxville	Tennessee	1951	1	
53	University of Mississippi	Oxford	Mississippi	1952	1	
54	University of Louisiana	Baton Rouge	Louisiana	1953	1	
55	University of Arkansas	Fayetteville	Arkansas	1954	1	
56	University of Missouri	Columbia	Missouri	1955	1	
57	University of Iowa	Iowa City	Iowa	1956	1	
58	University of Nebraska	Lincoln	Nebraska	1957	1	
59	University of Kansas	Lawrence	Kansas	1958	1	
60	University of Oklahoma	Norman	Oklahoma	1959	1	
61	University of Colorado	Boulder	Colorado	1960	1	
62	University of Arizona	Tucson	Arizona	1961	1	
63	University of New Mexico	Albuquerque	New Mexico	1962	1	
64	University of Idaho	Boise	Idaho	1963	1	
65	University of Montana	Helena	Montana	1964	1	
66	University of Wyoming	Laramie	Wyoming	1965	1	
67	University of Utah	Salt Lake City	Utah	1966	1	
68	University of Nevada	Reno	Nevada	1967	1	
69	University of Oregon	Eugene	Oregon	1968	1	
70	University of Washington	Seattle	Washington	1969	1	
71	University of California	Berkeley	Calif.	1970	1	
72	Stanford University	Stanford	Calif.	1971	1	
73	Harvard University	Cambridge	Mass.	1972	1	
74	Yale University	New Haven	Conn.	1973	1	
75	Columbia University	New York	N.Y.	1974	1	
76	University of Michigan	Ann Arbor	Mich.	1975	1	
77	University of Wisconsin	Madison	Wis.	1976	1	
78	University of Illinois	Urbana	Ill.	1977	1	
79	University of Texas	Austin	Texas	1978	1	
80	University of Georgia	Athens	Georgia	1979	1	
81	University of Florida	Gainesville	Florida	1980	1	
82	University of Alabama	Tuscaloosa	Alabama	1981	1	
83	University of South Carolina	Columbia	South Carolina	1982	1	
84	University of North Carolina	Chapel Hill	North Carolina	1983	1	
85	University of Virginia	Charlottesville	Virginia	1984	1	
86	University of Kentucky	Lexington	Kentucky	1985	1	
87	University of Tennessee	Knoxville	Tennessee	1986	1	
88	University of Mississippi	Oxford	Mississippi	1987	1	
89	University of Louisiana	Baton Rouge	Louisiana	1988	1	
90	University of Arkansas	Fayetteville	Arkansas	1989	1	
91	University of Missouri	Columbia	Missouri	1990	1	
92	University of Iowa	Iowa City	Iowa	1991	1	
93	University of Nebraska	Lincoln	Nebraska	1992	1	
94	University of Kansas	Lawrence	Kansas	1993	1	
95	University of Oklahoma	Norman	Oklahoma	1994	1	
96	University of Colorado	Boulder	Colorado	1995	1	
97	University of Arizona	Tucson	Arizona	1996	1	
98	University of New Mexico	Albuquerque	New Mexico	1997	1	
99	University of Idaho	Boise	Idaho	1998	1	
100	University of Montana	Helena	Montana	1999	1	

Continued on following page

APPENDIX D

DATA SYSTEMS SPECIFICATIONS¹

The following elements should be included in Data Systems Specifications:

Inputs

- Identification
- Organization of records and fields
- Nature of data--alphabetic or numeric
- Volumes--maximum and average for fields, records, and characters
- Frequency and schedule
- Physical medium planned--indicate extent of leeway which will be allowed vendors on this question

Files

- Identification
- Organization of records and fields
- Nature of data--alphabetic or numeric
- Volumes--maximum and average for fields, records, and characters
- Frequency and schedule
- Physical medium planned--indicate extent of leeway which will be allowed vendors on this question

Outputs

- Identification
- Organization of records and fields
- Nature of data--alphabetic or numeric
- Volumes--maximum and average for fields, records, and characters
- Frequency and schedule
- Physical medium planned--indicate extent of leeway which will be allowed vendors on this question

Systems Descriptions. Narrative, flow chart, and/or decision table descriptions of the proposed system and its subsystems. These descriptions should be so organized as to give detailed guidance to programmers and to give a broad but specific statement for executive review. Requirements for remote devices, communication links, or other specific features should be included in this section

¹U. S. Department of the Navy, Office of the Secretary, Management Information and Data Systems; Plans and Procedures for Coordination of, Inst. 5200.14, November 3, 1965, Encl. 3 PP6-8.

Time Constraints. Specific limitations on both total computer utilization time and (if appropriate) individual turn-around times.

Software Requirements. Assembler, compiler, operating program and any other software requirements. Definitive criteria concerning acceptable status of software development are encouraged. If a COBOL compiler is not specified, justification therefor should be included in the other section of the System Description and Implementation Plan.

Delivery Requirements. Both a desired date and a mandatory date may be given, if desired. Vendors should be warned that firm delivery acceptance dates cannot be established by the Government prior to a successful readiness review.

Documentation Requirements. Statement of information which must be provided by the vendor to permit Navy validation of run time estimates and assessment of equipment suitability. This should ordinarily include information on site preparation requirements, preventive maintenance requirements, reliability records, and the literature normally available on hardware characteristics and timing techniques.

Training and Technical Support Requirements. Specify any requirements.

Debugging. Facilities and provisions for debugging prior to and after installation.

Equipment Back-up. Locations of installations which could provide coverage in case of extensive down time.

Maintenance. On call or on site requirements.

Benchmark Programs. State whether benchmark program demonstrations will be required of all vendors making proposals, selected vendors, or none.

Notification of Vendors. Specifications should state that vendors will not be notified of selection results until final approval has been obtained.

Prices. Prices should be obtained for:

- (1) Lease for the anticipated workload
- (2) Purchase, with maintenance for the anticipated workload
- (3) Lease with option to purchase
- (4) Trade-in value of the proposed equipment at the end of the period judged to be its likely life in this system. This figure will be used as the residual value in making purchase versus lease analyses.

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- U. S. House of Representatives, Committee on Post Office and Civil Service. Use of Electronic Data Processing Equipment in the Federal Government. Report No. 858, 88th Cong., 1st Sess., 1963.
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- U. S. Comptroller General. Management of Automatic Data Processing Facilities in the Federal Government. Report to the Congress No. B115369, August 31, 1965.
- U. S. Comptroller General. Plans for Purchase of Leased Automatic Data Processing Components in use at Military Installations. Report to the Congress No. B146796, February 25, 1964.
- U. S. Comptroller General. Review of the Administration of Contracts for Rental of Automatic Data Processing Equipment at Selected Military Installations within the Department of Defense. Report to the Congress No. B-146732, June 29, 1962.
- U. S. Comptroller General. Review of Automatic Data Processing System used in Supply Management by the Department of the Navy Aviation Supply Office, Philadelphia, Pennsylvania. Report to the Congress No. B-133118, May 31, 1962.
- U. S. Comptroller General. Review of Problems Relating to Management and Administration of Electronic Data Processing Systems in the Federal Government. Report to the Congress No. B115369, April 30, 1964.

APPENDIX

GOVERNMENT DOCUMENTS

1. The Bureau of Investigation, Department of Justice, has been authorized to conduct a study of the activities of the Communist Party, U.S.A., and its branches in the United States.

2. The Bureau of Investigation, Department of Justice, has been authorized to conduct a study of the activities of the Communist Party, U.S.A., and its branches in the United States.

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9. The Bureau of Investigation, Department of Justice, has been authorized to conduct a study of the activities of the Communist Party, U.S.A., and its branches in the United States.

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- U. S. Bureau of the Budget. Responsibilities for the Administration and Management of Automatic Data Processing Activities. Circular No. A-71. March, 1965.
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- U. S. Department of Defense. Responsibilities for the Administration of Automatic Data Processing Equipment Program. Directive No. 5100.40. September, 1963.
- U. S. Department of Defense. Reutilization Screening of Automatic Data Processing Equipment. Instruction No. 4160.19. August, 1964.
- U. S. Department of Defense. Selection and Acquisition of Automatic Data Processing Equipment (ADPE). Directive No. 4105.55. September, 1963.
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- U. S. Department of the Navy, Office of Naval Material. Surveillance and Procedures in Evaluating the Reasonableness of Contractors' Automatic Data Processing Equipment (ADPE) Costs. Notice No. 10462. December, 1965.
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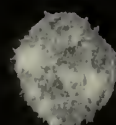
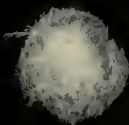
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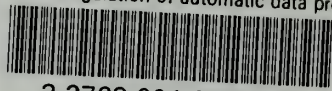
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